The Nicaraguan Health System

An overview of critical challenges and opportunities

February 2011

PATH

This document is part of a larger case study on Nicaragua's health system and diagnostic needs. The health system case study employed two main methodological approaches. The first was a review of official Ministry of Health (MINSA) data and epidemiological reports, as well as publications in peer-reviewed journals. The second was a concurrent series of field visits in 2008 to provide firsthand evidence of diagnostic needs and difficulties. A more detailed account of these methodological approaches can be found in the methodology section of the health system case study.

Acknowledgment

Primary funding for this study was provided by the National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering (grant U54 EB007949).

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Suggested citation

Sequeira M, Espinoza H, Amador JJ, Domingo G, Quintanilla M, and de los Santos T. *The Nicaraguan Health System*. Seattle, Washington: PATH; 2011.

About PATH

PATH is an international nonprofit organization that creates sustainable, culturally relevant solutions, enabling communities worldwide to break longstanding cycles of poor health. By collaborating with diverse public- and private-sector partners, PATH helps provide appropriate health technologies and vital strategies that change the way people think and act. PATH's work improves global health and well-being.

Cover photo: PATH/Tala de los Santos

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Glossary

Brigadistas	Independent health volunteers trained by MINSA to serve rural areas.
Col-vol	Voluntary collaborators, specialized brigadistas.
CNDR	Centro Nacional de Diagnóstico y Referencia (National Diagnostic and Reference Center)
ELISA	Enzyme-linked immunosorbent assay
FSLN	Frente Sandinista de Liberación Nacional (Sandinista National Liberation Front)
INETER	Instituto Nicaragüense de Estudios Territoriales (Nicaraguan Institute for Territorial Studies)
INSS	Instituto Nicaragüense de Seguridad Social (Nicaraguan Social Security Institute)
MINSA	Ministerio de Salud (Ministry of Health)
PAHO	Pan American Health Organization
PATH	Program for Appropriate Technology in Health
PESL	Local Sanitary Emergency Plan
RAAN	Región Autónoma del Atlántico Norte (North Atlantic Autonomous Region)
RAAS	Región Autónoma del Atlántico Sur (South Atlantic Autonomous Region)
SILAIS	Sistemas Locales de Atención Integral de Salud (Local Comprehensive Health Care Systems, which are the Nicaraguan health system's 17 administrative units corresponding to the country's departments and autonomous regions)

Executive summary

Determining the best treatment for illness requires prompt, reliable diagnosis. Although recent advances in technology have enhanced diagnostic capacity, especially in high-income nations, new diagnostic technologies are often unavailable in developing countries.

PATH conducted formative research to identify unmet needs where diagnostic technologies could play a pivotal role in Nicaragua, one of the poorest countries in Latin America. The study consisted of literature reviews and multiple field visits to characterize current diagnostic testing and national control strategies for a number of epidemiologically important diseases, including malaria, dengue, leptospirosis, Chagas disease, HIV/AIDS, and tuberculosis (TB). It also assessed user requirements and identified potential barriers to the introduction of new diagnostic tests.

This case study highlights many of the challenges that technology developers, public health officials, and others will face in developing and deploying new diagnostic tools for use within the Nicaraguan health care system. Major challenges include the limited number of health personnel, many of whom are already overwhelmed by a heavy patient load; the highly inequitable distribution of health services, which results in large underserved communities; the high risk of frequent epidemic outbreaks; a fragmented health information system; and implementation of a new government-mandated health care model.

Development and introduction of new diagnostic tests appropriate for use in Nicaragua will help to address observed quality-of-care problems, such as long patient waiting times for medical appointments and lab results. By increasing the ability of health care providers to pinpoint the causative agent for illness, diagnostic tests can help reduce misdiagnosis and enable more rapid, effective treatment for patients.

Ensuring success of the new health care model that Nicaragua is currently implementing requires strengthening the epidemiological surveillance system and improving the monitoring and supervision of the overall health care system. The deployment of appropriate diagnostic technologies could play a helpful role in this regard. Nicaragua has a significant level of underreporting of disease due to the health system's limited coverage of the population and inadequate diagnostic capabilities. New diagnostic tools can help to improve disease surveillance and strengthen the health information system by providing faster results and reporting in response to outbreaks, new or emergent diseases, and changes in the epidemiological profile.

Diagnostic technologies that are successful in Nicaragua are also likely to work in neighboring Central American countries, many of which face similar health challenges. These include chronically under-funded health systems, uneven population distribution, susceptibility to epidemic outbreaks, poor quality of care, staff shortages in remote clinics, vast underserved territories with under-equipped health facilities, and a fragmented health information system with limited epidemiological surveillance capabilities.

Introduction

Better access to diagnostic testing is essential to improving the health of underserved populations in low-resource settings (LRS) around the world. With diagnostic tests, health care providers can confirm or rule out disease in a patient presenting with undifferentiated symptoms such as respiratory distress, fever or diarrhea. Safe and effective treatment can be immediately started. In cases where the choice of treatment can lead to undesirable outcomes, either drug side effects or the emergence of drug resistance, the ability to pinpoint the causative agent can be even more valuable.

Recent technological advances in the field of diagnostics (e.g. microfluidics, micro-arrays, molecular testing, and new biomarkers) promise a new generation of multivalent diagnostic tests that can be used at the point of care (POC) in LRS. To guide technical product development, it is critical to identify the appropriate product specifications for use in LRS. Furthermore, we also need to identify the potential barriers to the introduction of these new tests in order to develop appropriate introduction strategies that promote product uptake.

Our overall goal for conducting this research is to identify opportunities where the use of new diagnostic technologies could address unmet clinical needs. As the first stage of this research, PATH launched a formative research study in Nicaragua. We wanted to answer the following key research questions:

1. What are the unmet clinical needs, and how can they be addressed by new diagnostic technologies?
2. What are the user requirements and product specifications?
3. What are the barriers to and facilitators of product uptake?

Our research objectives are:

1. To understand the overall Nicaraguan health care system.
2. To describe and characterize current diagnostic practices within the context of national control efforts for select diseases of epidemiological relevance, including malaria, dengue, leptospirosis, Chagas disease, HIV/AIDS, and TB.

We hope that the findings from this research will help inform the development and eventual deployment of new diagnostic technologies. When product design is guided by the needs and realities of the users, we have a better chance of creating technologies that bypass the "innovation pileup" and getting them into the hands of people who need them most.

Methodology

Literature review

We conducted an extensive literature review of available data from published peer-reviewed journals, reports from United Nations agencies, and from official Nicaraguan Ministry of Health (MINSA) reports, including annual program reports, annual laboratory reports, laboratory norms, a conceptual document on the country's new health care model, the current government's short-term outcome plan, and the five-year national health plan. We also accessed data and epidemiological reports from the Nicaraguan health ministry's epidemiological surveillance system. Some of this information was accessed

online at the Ministry of Health website (www.minsa.gob.ni), with certain reports on malaria, dengue, leptospirosis, Chagas disease, HIV/AIDS, and TB proving particularly helpful.

Field visits (May to October 2008) and interviews with key informants

The research team conducted a series of field visits to gather information from various sources to provide first-hand evidence of diagnostic needs and difficulties. Three rounds of field visits took place in 2008 to interview key informants across Nicaragua both individually and collectively. The primary information collection tool was an open-ended interview guide for individual and group interviews. In later visits, we employed a more structured guide to gather specific detailed data and to conduct direct observation of laboratories. The researchers sought answers to three main questions:

1. What are the unmet clinical needs, and how can they be addressed by new diagnostic tests?
2. What are the user requirements and/or product specifications?
3. What are the barriers and facilitators to product uptake?

Members of the research team interviewed health workers from various levels of the health system. Informants included nurses and doctors working at the POC (consulting room), laboratory personnel, health facility directors, and the directors of national-level programs (malaria, dengue, HIV, parasitology, virology, epidemiological surveillance). Representatives from local nonprofit health organizations were also interviewed. A total of 33 individual interviews were conducted, and an additional 68 people participated in group discussions. The research team included personnel from the PATH country office in Managua and the PATH office in Seattle.

The locations visited were diverse, reflecting the country's three major geographical regions (Pacific, Northern/Central, and Caribbean coast).[a] These regions also reflect socioeconomic differences, with the Pacific being the most urbanized and industrialized region. Health facilities were selected to represent different health care levels (primary, secondary, central), work units within health facilities (laboratory, consulting rooms), type of population (urban or rural), and to a lesser extent ethnicity (presence of indigenous peoples).

The first round of visits (May 2008)

Three researchers (one local and two international) investigated the perceptions of top Ministry of Health authorities (including the Minister of Health) regarding the current situation of the health system and the challenges involved in proving quality health care services.

Pacific Region

- Managua: The Ministry of Health's central offices (MINSA Central), the "La Mascota" Children's Hospital, and two main public health centers.
- Masaya: SILAIS, a hospital, a rural health post (La Laguna), and an urban health center (Monimbó).
- Northern and Central Region
- Jinotega: SILAIS a hospital,.
- Matagalpa: SILAIS, a hospital, a municipal health center (La Dalia).
- Caribbean Region
- Bluefields: a SILAIS, a hospital, and a health center.
- Rama Kay: a health post.
- Pearl Lagoon: a health center.
- Hallover: a health post.
- Kukra Hill: a health center.

[a] Nicaragua's Caribbean coast comprises two autonomous regions: the South Atlantic Autonomous Region (RAAS) and the North Atlantic Autonomous Region (RAAN).

Second round of visits (August 2008)

This time, the research team (two local and two international members) conducted group and individual interviews with a more structured interview guide, as well as direct observation of laboratories. The purpose was to obtain detailed information from health workers on cultural barriers and institutional bottlenecks that affect use of diagnostic tests. Representatives from local nongovernmental organizations (NGOs) were also interviewed, including the Nicaraguan Association of People Living with HIV (Asonvihsida) and the NicaSalud network of NGOs working in health.

Pacific Region

- Managua: Asonvihsida (NGO), NicaSalud (NGO), National HIV Program, National Diagnostic and Reference Center (CNDR–the national central laboratory).
- Granada: Regional laboratory and hospital.
- Caribbean Region
- Bluefields (RAAS): a hospital and SILAIS.
- Pearl Lagoon: a health center.
- Kukra Hill: a health center.

Third round of visits (October 2008)

One researcher conducted this last round of visits, mainly interviewing laboratory personnel and community collaborators. This visit was an extension of the second visit, with the purpose of understanding diagnostic capabilities of health care providers at the POC.

Pacific Region

- Managua: Program directors (malaria, dengue, HIV, parasitology, virology).
- Chinandega: Hospital laboratory.
- León: SILAIS laboratory.
- Carazo: Hospital laboratory.
- Rivas: Hospital laboratory.
- Northern and Central Region
- Estelí: Hospital laboratory.
- Nueva Segovia: Hospital laboratory and the community of Jalapa.
- Jinotega: SILAIS laboratory.
- Matagalpa: Regional laboratory.
- Chontales: SILAIS laboratory.

Overview of socioeconomic factors and health indicators

Social, economic, and other factors

Nicaragua is the largest country in Central America, covering an area the size of Greece or the US state of Louisiana. It borders Honduras to the north and Costa Rica to the south, and the country is delimited to the east by the Caribbean Sea/Atlantic Ocean and to the west by the Pacific Ocean.

Topographically, Nicaragua is divided into three regions: Pacific, Caribbean, and Central. These regions are further subdivided into 17 political and administrative departments, which in health terms correspond to Local Comprehensive Health Care Systems (SILAIS). A total of 15 of the SILAIS are located in the Pacific and Central regions. The other two correspond to the North Atlantic Autonomous Region (RAAN) and the South Atlantic Autonomous Region (RAAS), which are the country's two largest territories, located in the Caribbean coast area.

Nicaragua is one of the most sparsely populated countries in Central America, with a population of about 5.7 million spread over roughly 130,373 square kilometers, giving an average population density of 45 inhabitants per square kilometer. The population is unevenly distributed, with 53.3% of

the total population living in the Pacific Region, which only accounts for 15.3% of the national territory. Managua, the capital city, has almost 1.4 million inhabitants, or about 25% of the total population.[1]

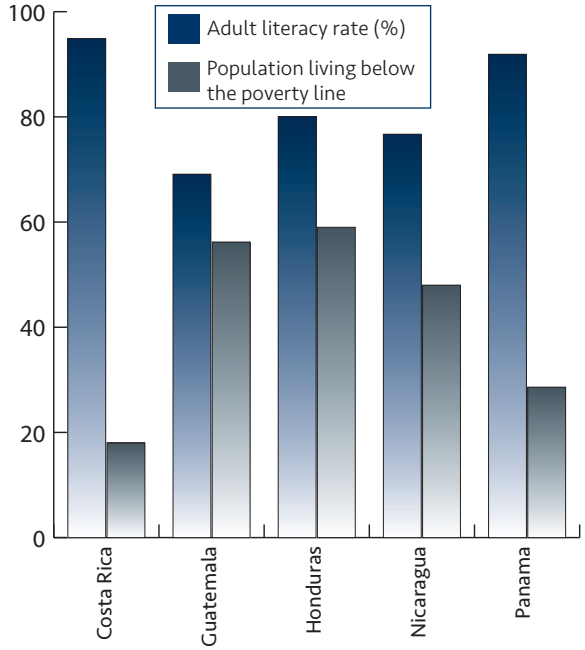
The population in the Pacific Region is mainly mestizo, descended from the mixing of 16th-century Spanish colonizers and local indigenous peoples. The country's industry and agriculture are concentrated in this region, as well as most resources, including health resources. In contrast, the Caribbean Region accounts for 55.2% of the country's territory but only 10.0% of its population. The population there is partly mestizo and partly the direct descendents of the area's indigenous peoples and of African slaves brought to the area in the 18th century. These groups have different languages and cultural norms.

Nicaragua is one of the poorest countries in the Western Hemisphere, lagging behind other Central American countries on many socioeconomic indicators. Adult literacy is 77% (2001), per capita gross national income (GNI) is US$2,720, and 48% of the population live under the poverty line (Figure 1).

Poverty is widespread in the country. Almost half of the population live in overcrowded conditions; 73% of households in rural areas have an unsuitable water supply; 33% of the country's households have no electricity service, with the rate twice as high in rural areas; and 59% of households use firewood for cooking. Proper waste management is a national problem, which is reflected in the fact that 70% of garbage is not collected or processed and 14.2% of households resort to throwing garbage into the streets. Twenty percent of children under the age of five suffer from chronic malnutrition, and the mean life expectancy is less than 70 years.[2]

Between 35% and 40% of the population lack access to health services, and 78% of the economically active population (more than 1,748,000 people) has no health insurance.[3]

FIGURE 1. **Literacy and poverty rates in Nicaragua and neighboring countries.**



Source: WHOSIS database[2]

Although the official unemployment rate is only about 4%, underemployment is high, and most of the working population engages in the informal economic sector. The country's age distribution is one of the factors that contributes to chronic poverty: 47% of the population is less than 20 years old, and only 46.7% is between 20 and 59 years old.

Another challenge that Nicaragua faces is natural disasters. The country is highly vulnerable to hurricanes, volcanic eruptions, earthquakes, landslides, droughts, and floods. When such disasters strike, they can wipe out incremental gains in health and economic progress.

Major health indicators

Nicaragua's epidemiological profile is considered pretransitional, with high rates for both infectious diseases and maternal and child morbidity and mortality. The rates corresponding to chronic diseases, accidents, and violence are also increasing. The Ministry of Health's stated top priorities include:

- Maternal mortality.
- Infant mortality.

- High fertility and birth rates.
- Chronic infant malnutrition.
- High prevalence of acute respiratory illness and diarrheal disease.
- High prevalence of endemic diseases, such as malaria, dengue fever, and TB, and increased prevalence of HIV/AIDS.
- Elimination of measles, rubella, malaria, and rabies.
- High incidence of occupational accidents.
- High prevalence of mental health problems.
- High rate of disability.
- Violence-related injuries, morbidity, and mortality.
- Chronic disease morbidity and mortality.
- Cancer mortality.

Maternal and child health indicators

Nicaragua has one of the highest fertility rates in Latin America. The total fertility rate is 2.7 children per woman, with big differences between urban zones (2.2) and rural zones (3.5).[4] The fertility rate also varies by ethnic origin. A high fertility rate among low-income groups reinforces socioeconomic inequities and keeps poverty chronic from generation to generation. In turn, chronic poverty fuels high maternal, prenatal, and infant mortality rates.

The country has a high maternal mortality rate, with a recent average of more than 100 deaths per year. The rate has recently declined, however, from 86.5 per 100,000 registered live births in 2005 to 69.8 per 100,000 estimated live births in 2007.[b] Maternal mortality in Nicaragua hits hardest in the RAAN and RAAS autonomous regions (Caribbean coast), Río San Juan (on the southern border with Costa Rica), and Jinotega and Matagalpa (in the north of the country). Seventy percent of deaths occur in rural areas. The most affected age groups are adolescents and women over 35 years old. The leading cause of maternal death is postpartum hemorrhage, followed by hypertensive diseases of pregnancy and sepsis. These causes of death are related to high fertility rates and difficulties accessing health services in poverty-stricken regions.[5]

More than 28.6% of children suffer some degree of undernutrition. The situation is even worse in rural areas, where 36.9% of children are undernourished.5 The prevalence of vitamin A deficiency among preschool-age children was 1.8% in 2003, although this has since fallen thanks to the fortification of sugar and the implementation of various health campaigns. The prevalence of anemia due to iron deficiency was 40% among women and 45% among schoolchildren.[6]

Infant mortality has been reduced from 50 per 1,000 live births in 1992 to 33 in 2005 and 29 in 2007.3 Leading causes of death are neonatal-related complications (short gestation, low birth weight, asphyxia, and sepsis) followed by respiratory distress of newborns and diarrhea. Sixty-five percent of infant deaths occur in the first week of life. The RAAN and RAAS, Jinotega, Managua, Chontales, and Carazo have the highest infant mortality rates, and rates are especially high in the RAAN municipalities of Waspán, Siuna, and Prinzapolka; the RAAS municipalities of La Cruz de Río Grande and Tortuguero; and the Jinotega

TABLE 1. **Top six causes of admission to hospital in Nicaragua, 2007**

Cause of admission	Percentage of admissions
Maternal health related	29.37%
Pneumonia	7.03%
Diarrhea	3.71%
Appendicitis	2.23%
Gall bladder and related disorders	2.18%
Diabetes	2.18%

Source: Ministry of Health statistics

[b] At the time the data for this study were being collected, the official rate had not been calculated, so the figure for 2007 was an estimate based on the registered number of maternal mortalities divided by an estimate of the total live births. It is also important to note that in Nicaragua the maternal mortality surveillance system only captures about 60% of the total mortality in the country.

municipalities of Wiwilí and Bocay[7] (see Appendix A-1).

The leading causes of admission to public hospitals are related to maternal health, followed by pneumonia and diarrhea (Table 1 and Appendix A-2).

Mortality indicators

In recent decades, mortality from infectious diseases, including diarrheal disease, has declined. Chronic diseases (cardiovascular, kidney, and hepatic diseases and diabetes), prenatal conditions, and pneumonia currently represent leading causes of mortality (Table 2). Mortality is higher among men than women in all age groups, and the highest mortality rates are among people over 65 and children under 1 year old.[8]

TABLE 2. **Leading causes of death in Nicaragua, 2005.**

Cause of death	Cases	Rate per 100,000
Acute myocardial infarction	1,792	31.6
Diabetes mellitus	1,159	20.4
Cerebrovascular diseases	1,146	20.2
Chronic renal failure	965	17.0
Pneumonia	803	14.1
Liver ailment	686	12.1
Prenatal mortality	674	11.8
Arterial hypertension	570	10.0
Other heart diseases	549	9.6
Chronic obstructive pulmonary diseases	461	8.1
Total for the 10 leading causes	8,805	
Total mortality of all causes	17,157	

Source: Ministry of Health

Morbidity indicators

Chronic diseases and other noninfectious causes of mortality

In contrast to maternal and infant mortality, chronic diseases in Nicaragua are more prevalent in the Pacific Region, including Granada, Managua, León, Chinandega, and Masaya (Appendix A-3). The higher prevalence of chronic disease in these areas is associated with dietary choices, alcohol and tobacco use, lack of physical exercise, and higher levels of stress in urban areas. Matagalpa has the highest cancer and suicide rates in the country. These rates are influenced by the poorer diet and higher stress levels that result from being in the most urbanized part of the Central Region, and from the lingering health effects of recent armed conflicts in that area.

Although the rate of diabetes has been increasing in recent years, hypertension rates have remained stable. A recent survey in the capital city of Managua found the prevalence of diabetes and hypertension to be 9% and 25%, respectively. Cervical and breast cancer are the main causes of death from tumors.[3]

Infectious diseases

Acute respiratory infections, diarrhea, and vector-borne diseases are the main communicable diseases in Nicaragua (Appendix A-4). Some diseases, including malaria and diarrheal disease, have shown favorable trends over the past few years. The Caribbean and North-Central zones have the highest rates of diarrhea, leishmaniasis, and malaria, due to poor sanitation and environmental conditions.

Diarrhea. The main cause of diarrhea is viral infection, followed by bacteria (Escherichia coli and Shigella) and parasites (Giardia and amoebas). The incidence of diarrhea, which mainly affects children under the age of five, increases in May, June, and July, coinciding with the onset of the rainy season (Appendix Figure A-1). In recent years, however, there were significant diarrheal epidemics during the dry period of the year. These occurred in 2005, before the introduction of the rotavirus vaccine, and again at the end of 2006. In 2005, the SILAIS with the highest rates of diarrhea were the RAAS, the RAAN, Río San Juan, Matagalpa, and Estelí.[6]

Dengue. Dengue fever has reached epidemic proportions, with an increasing risk of dengue hemorrhagic fever in urban zones. This risk depends on vector density levels, the viral serotypes currently in circulation, population susceptibility in each territory, and the degree to which vector control measures have been effectively implemented, particularly those that influence community behavior and practices and address environmental factors. Outbreaks mostly affect children, who are susceptible to different serotypes circulating in the territory.[9]

Malaria. Most malaria cases in Nicaragua are caused by Plasmodium vivax (95%), and the rest are associated with P. falciparum. The number of cases has fallen dramatically from approximately 70,000 in 1997 to fewer than 1,000 in 2007. Most of these occur in the RAAN, the RAAS and Matagalpa (2005), with P. falciparum cases predominantly found in the RAAN and RAAS.[10]

Leishmaniasis. The incidence of leishmaniasis has been rising due to increasing human interaction with the environment, which disturbs natural ecosystems. As more people build homes in heavily forested, mountainous areas, they come into contact with wild animals that can carry the pathogen. Also, household-based cycles involving domestic pets and intra-domiciliary cycles where humans become the main reservoir are increasingly frequent. Nicaragua has reported classical cutaneous, mucocutaneous, and visceral leishmaniasis and recently the atypical cutaneous leishmaniasis. Leishmaniasis rates are highest in Jinotega, followed by the RAAN, the RAAS, and Río San Juan.[6]

Chagas disease. Despite challenges related to the surveillance of Chagas disease, recent studies (2000–2003) in schoolchildren between 7 and 14 years of age in 15 departments showed a high seroprevalence, with values of 10.8% and 4.3% for Madriz and Nueva Segovia, respectively.[11]

Tuberculosis. TB is endemic, but the incidence has decreased from 88 per 100,000 inhabitants in 1987 to 39 per 100,000 in 2004. The highest rates persist in the RAAN and RAAS (110 and 59 cases per 100,000 inhabitants, respectively).[12]

HIV/AIDS. HIV/AIDS still has a low prevalence among the general population (<1%), but the annual incidence has increased from 2.52 per 100,000 in 2000 to 7.66 per 100,000 in 2005. Transmission is generally sexual (92%) and is usually a result of heterosexual relationships (73% of the total). Among heterosexual people who are HIV positive, women accounted for 31% in 2000 and 37% in 2005. Among men who have sex with men, the prevalence of HIV/AIDS is close to 9%. Knowledge of risk factors and protection is poor, especially in low-income regions.[13]

Vaccine-preventable diseases. Diseases preventable by vaccination (e.g., measles, whooping cough, rubella, tetanus) are under control. There have been no cases of polio cases since 1981 or of measles since 1995.[12]

Organization of the public health system

Ministry of Health

Health services in Nicaragua are mainly provided by the public sector and financed by general taxes. The primary health provider is the MINSA, officially covering about 70% of the population. The Nicaraguan Social Security Institute (INSS), which covers formal sector workers, finances health care for about 10% of the population.[14] Only a small percentage of the population receives private health care services (either for-profit or nonprofit).

MINSA is both a regulatory agency and a provider of health services. The former role is played mainly by MINSA Central, while the latter is implemented through a network of 1,059 health facilities administered by the 17 departmental SILAIS. MINSA conducts important public health activities and provides individual care and assistance for most of the country's uninsured population.

MINSA's mission is to provide Nicaraguan citizens with individually tailored health services, to guarantee free and universal access to health services, and to promote healthy practices and lifestyles that will improve quality of life and life expectancy and maximize national efforts to foster human development. MINSA seeks to develop a public health system that enforces the civil right to health care and addresses the inequality of services, while improving Nicaraguans' living conditions and helping the country advance.[15]

Health system levels

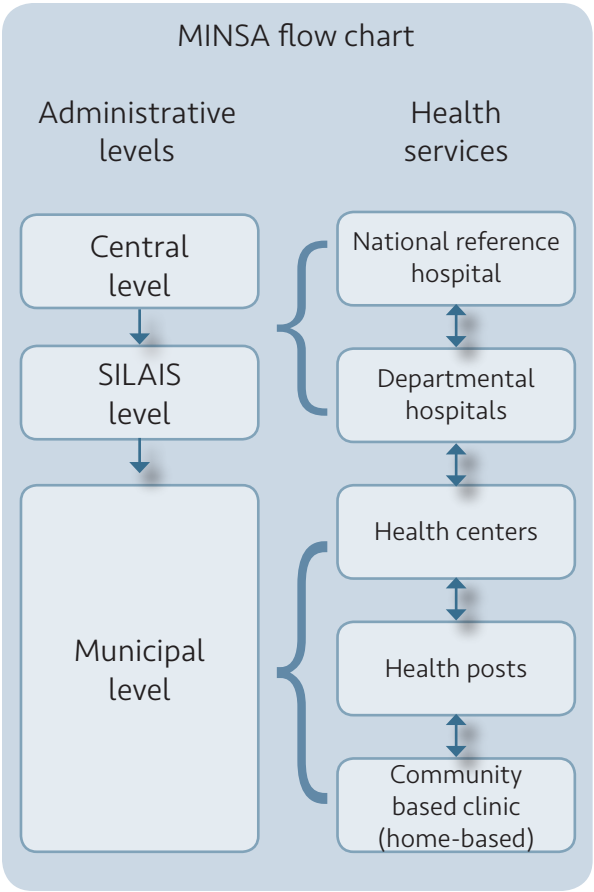
The Nicaraguan public health system can be divided into three administrative levels, each associated with certain types of health services, as shown in Figure 2.

At the central level, work is directed by the Minister of Health and implemented through four divisions and three directorates (Appendix Figure A-2).

At the SILAIS level, work is coordinated by a SILAIS director and a senior management team that includes the heads of financial/administrative services, health services, health surveillance, regulatory affairs, and human resources, as well labor union representatives. Municipal, departmental, and regional hospitals are under SILAIS jurisdiction.

The Ministry of Health's work in each municipality is coordinated by a municipal director and a senior management team made up of a nursing chief, a manager, an epidemiologist, and a doctor responsible for health care services. They are responsible for directly administering the network of health centers and health posts under their jurisdiction.

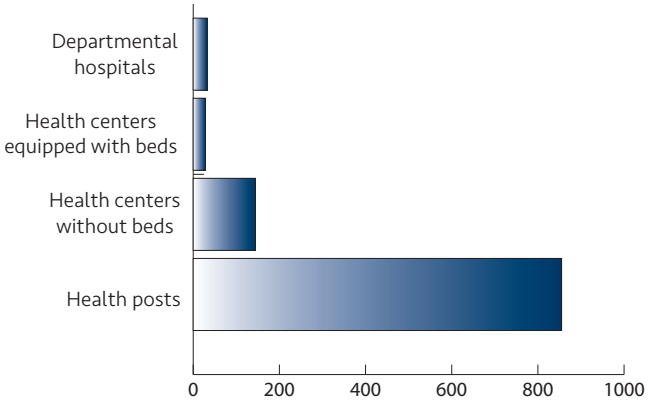
FIGURE 2. **The three levels of the Nicaraguan public health system.**



Network of health facilities

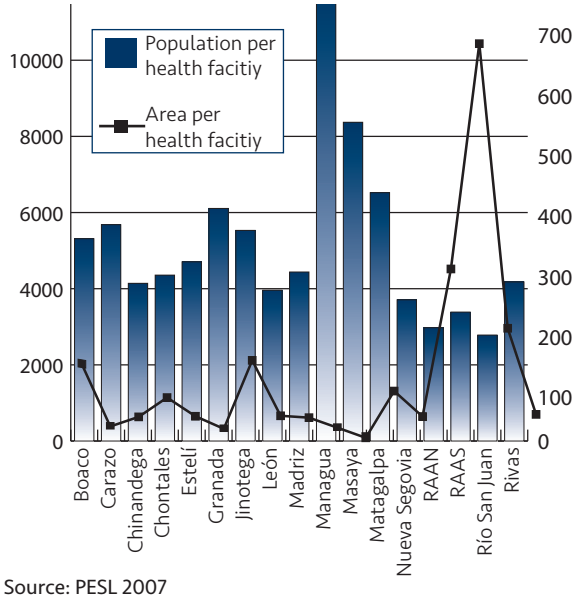
According to MINSA/Pan American Health Organization (PAHO) data, the national service network has 1,059 health care units. These consist of 32 hospitals, 28 health centers with beds, 144 health centers without beds, and 855 health posts, which vary in the amount of population and geographic area served (Figures 3 and 4).[16] These government facilities are supplemented by a community-based network that includes home-based facilities and maternity homes ("maternas casas").

FIGURE 3. **MINSA health care facilities.**



Source: MINSA.

FIGURE 4. **Health facility coverage by SILAIS.**



Source: PESL 2007

Hospitals

Nicaragua has 32 public hospitals. Twenty-one are classified as departmental reference hospitals, and 11 are national reference and specialty hospitals. Departmental reference hospitals provide inpatient care in internal medicine, pediatrics, obstetrics/gynecology, surgery, and orthopedics. They also provide emergency care, specialty outpatient care, clinical laboratory services, pharmacy services, and imaging. Some provide ultrasound, pathology, mental health, physical therapy, and other specialty services, such as the hyperbaric chamber in the RAAN.[c]

The national reference and specialty hospitals are located in Managua, and include:

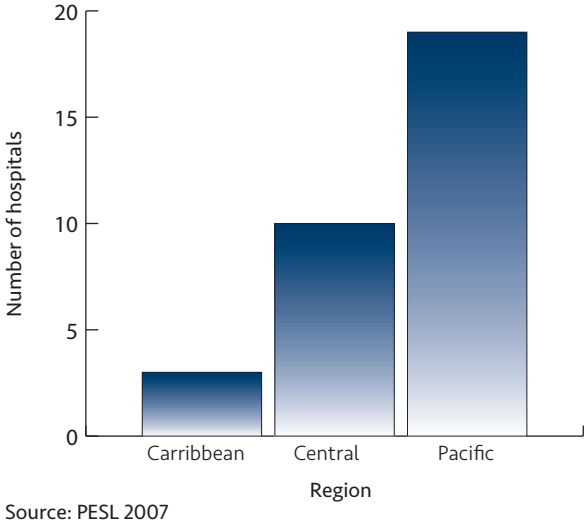
- Bertha Calderón Hospital (referrals for obstetrics/gynecology and ophthalmology services).
- La Mascota and Velez Páiz Hospitals (referrals for pediatrics and pediatric subspecialties).
- Manolo Morales Hospital (referrals for cardiology, gastroenterology, pulmonology, maxillofacial surgery, and orthopedics).
- German Nicaraguan Hospital (referrals for infectious diseases and HIV/AIDS).
- The Dermatologic Hospital.
- The Mental Health Hospital.

Most of the hospitals are located on the Pacific side, notably in Managua. There are only three hospitals in the Caribbean region, an area covering 55% of the national territory (Figure 5 and Appendix A-5).

The national average is one hospital per 212,800 people, but there is wide variation among SILAIS (Figure 6). Although hospitals in the RAAN, the RAAS, and Río San Juan provide coverage for smaller populations, compared to hospitals in Matagalpa and Chontales they cover a larger territory with a more dispersed rural population.[17] Access to hospital care can be more difficult in such settings. There is also a wide range in

[c] Used to treat and prevent decompression syndrome among divers who work in lobster and shrimp fishing without appropriate equipment. Diving injuries are common in the RAAN.

FIGURE 5. **Number of hospitals per region.**



Source: PESL 2007

the resources available at each hospital. For instance, Bluefields has many human resource and equipment needs. To meet current demand, the hospital requires an additional 35 human resources, including 9 doctors, 12 nurses and 4 laboratory technicians, as well as equipment such as electrocardiogram, oximeters and oxygen concentrators (Appendix A-19).

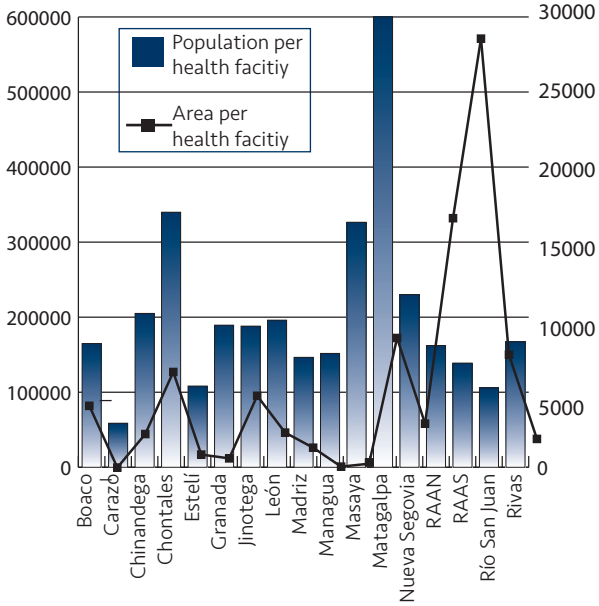
The hospital network needs substantial investment to upgrade facilities and to provide the human, financial, and material resources required to meet the population's growing health care needs.

Health centers

Health centers provide all primary health care services and are usually staffed with general practitioners or nurses. They provide pharmacy, basic laboratory, immunization, mental health, zoonosis, and environmental health services, and some offer dentistry. Certain health centers also have inpatient capabilities for minor health conditions. These health centers have emergency departments, while others located in more remote areas have specialized gynecology or pediatric outpatient consultations.

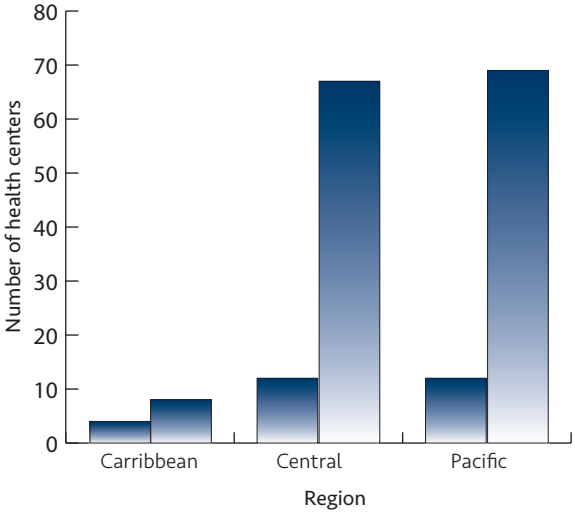
Most of the health centers are located in the Pacific and Central regions of the country (Figure

FIGURE 6. **Hospital coverage by SILAIS.**



Source: PESL 2007

FIGURE 7. **Health centers per region.**

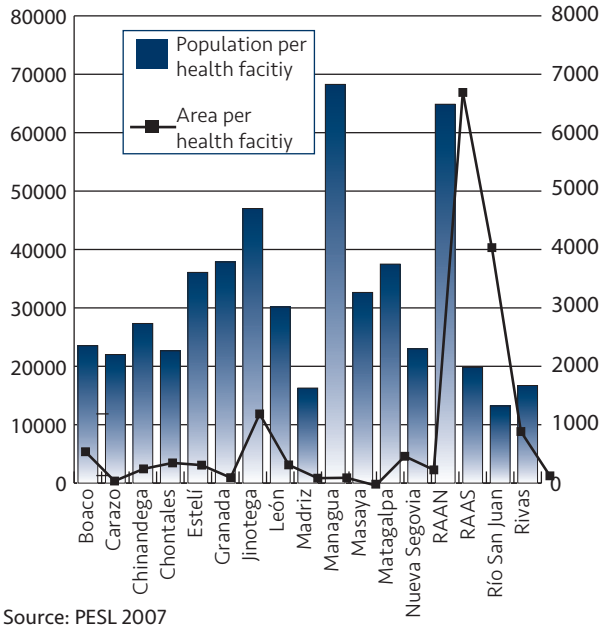


Source: PESL 2007

7). The Caribbean coast especially lacks health centers that are capable of admitting in-patients, especially given the lack of hospitals in the region.

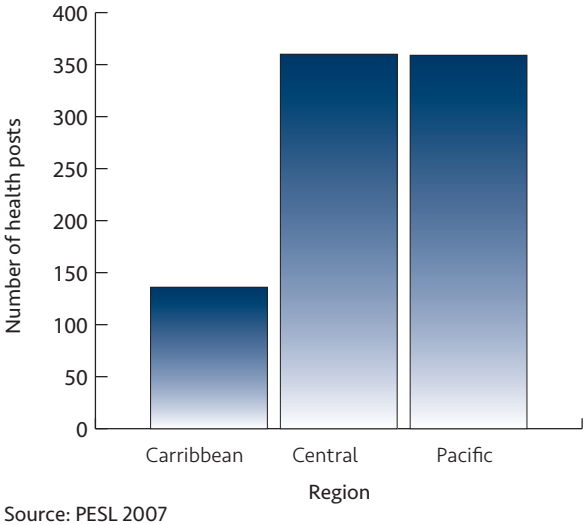
On average, a health center with inpatient capabilities serves a population of about 170,000, and a health center without beds serves 36,000 people.[17] These numbers vary widely from region to region, however (Figure 8).

FIGURE 8. **Health center coverage by SILAIS.**



Source: PESL 2007

FIGURE 9. **Number of health posts per region.**



Source: PESL 2007

Health posts

Nationwide, there are 855 health posts, which are under the jurisdiction of the health centers and serve a number of communities. They are staffed by one or two nurses, and in some cases a doctor is present on either a permanent or temporary basis. These facilities provide primary health care and undertake health promotion and disease prevention activities. This translates into the following specific activities: comprehensive health care for women and children, health care for general morbidity, community education, primary emergency care, immunizations, epidemiological surveillance, pharmacy services, and the completion of various statistical information forms. Some health posts also offer rapid malaria or HIV/AIDS testing. All of these activities result in a work overload for staff working at this level. The distribution of health posts is shown in Figure 9. As was the case for hospitals and health centers, there are fewer health posts in the Caribbean Region compared to other parts of the country.

On average, there is one health post per 6,400 inhabitants, but this figure varies widely from one area to another. Each health post in Managua, for example, serves many more people than posts in the RAAN.[18] As mentioned previously, however, the marked dispersion of the rural population in large territories such as the RAAN and the RAAS can lead to less efficient coverage by health centers and health posts.

Community-based health network

One of the strengths of the Nicaragua health system is its nationwide community-based health network that includes almost 4,400 home-based community clinics and 33 maternity homes ("casas maternas"). This health network has an impressive network of MINSA-trained independent volunteers, including 12,700 "brigadistas," 6,200 midwives, and 7,100 "voluntary collaborators" (see below), all linked to the Ministry of Health; 2,800 health promoters, who work with projects linked to nongovernmental organizations; and 340 health representatives on community boards linked to the municipal governments.[3] These individuals undertake health promotion activities at the community level with no remuneration from MINSA.

The program to train independent health volunteers, known as "brigadistas," was started by MINSA during the Sandinista government of the 1980s, primarily to serve rural areas. Brigadistas receive several months of training. Specialized

brigadistas, called voluntary collaborators ("col-vols"), are primarily responsible for malaria control efforts.

The activities of selected groups are highlighted below:

Brigadistas

- Providing community-based education and health outreach.
- Through home visits, identifying and referring pregnant women, girls needing family planning, malnourished children, and children in need of immunization.
- Identifying and referring patients to health units, with emphasis on children and women.
- Reporting deaths and referring and reporting potentially communicable diseases.
- Conducting a community census.
- Providing support for national health campaigns (immunization, anti-epidemic days) within their communities. This includes encouraging people to participate, arranging locations for developing these activities locally, and helping manage medical inputs such as antiparasite medicine, antilice medicine, and oral rehydration solution.
- Weighing children monthly as part of a community-based activity called PROCOSAN.
- Administering contraceptives to local women previously registered for this program in the health units.
- Monitoring patient progress in accordance with referrals made by health units.

Voluntary collaborators ("col-vols")

- Managing suspected cases of malaria, including conducting a rapid diagnostic strip test, whenever available, or creating a thick smear slide for diagnosis at a local health unit.
- Administering antimalaria medication and providing follow-up.
- Supporting community sanitation measures such as elimination of mosquito breeding sites.
- Educating the public about malaria prevention.
- In some cases, using or distributing basic medical input stock such as oral rehydration solution, acetaminophen, and chlorine for water disinfection.

Midwives

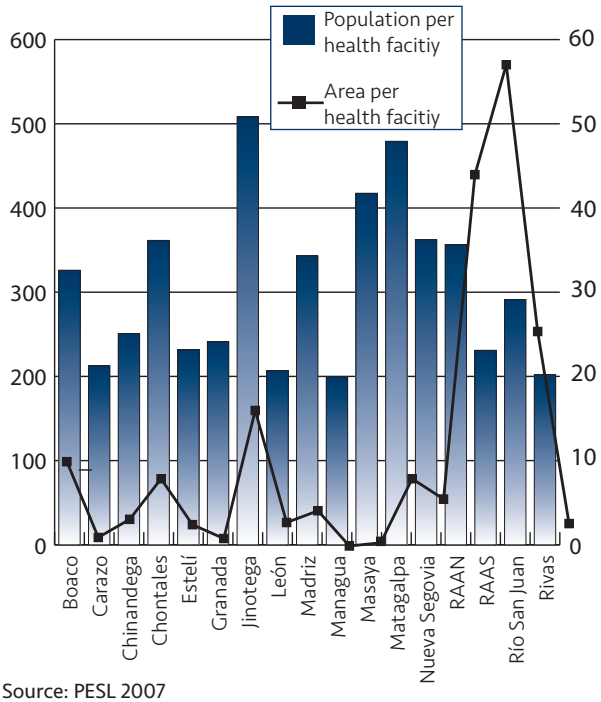
- Identifying and referring pregnant women for prenatal services and health facility-based delivery.
- Keeping a local census of pregnant women.
- Monitoring the delivery plan for pregnant women in their community.
- Providing health care services for uncomplicated deliveries.
- Promoting family planning methods.

A Community Information System has been established to collect and share information related to the community-based health network.

Human resources

As of 2007, MINSA had 20,913 workers on the payroll countrywide (Appendix A-6). On average, there are 4.5 doctors, 3.4 registered nurses, 7.1 auxiliary nurses, and 9.2 available beds per 10,000

FIGURE 10. **Population and area served per health care worker by SILAIS.**



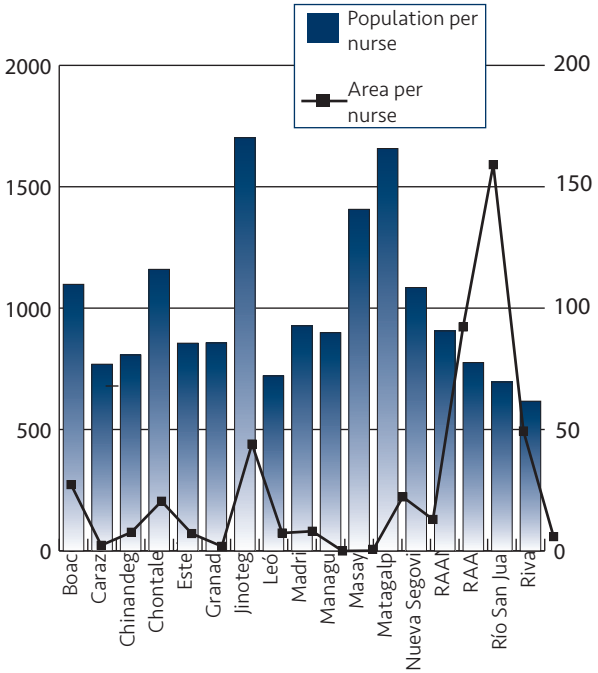
Source: PESL 2007

people. The average annual number of ambulatory care visits is 1.9 per inhabitant, with 1.3 medical consultations per inhabitant.[19]

The distribution of health workers varies substantially by region (Figures 10 through 12). Sixty-five percent (13,900) are concentrated in the Pacific coast region, 16% (3,500) in the Central zone, 10% (2,100) in the northern zone, and 9% (1,900) in the Caribbean region.[16] Nurses are critically needed in Jinotega, Matagalpa, and Masaya (Figure 11), while the lowest doctor-to-patient ratios are found in the RAAN, Río San Juan, Chontales, Jinotega, and the RAAS (Figure 12).

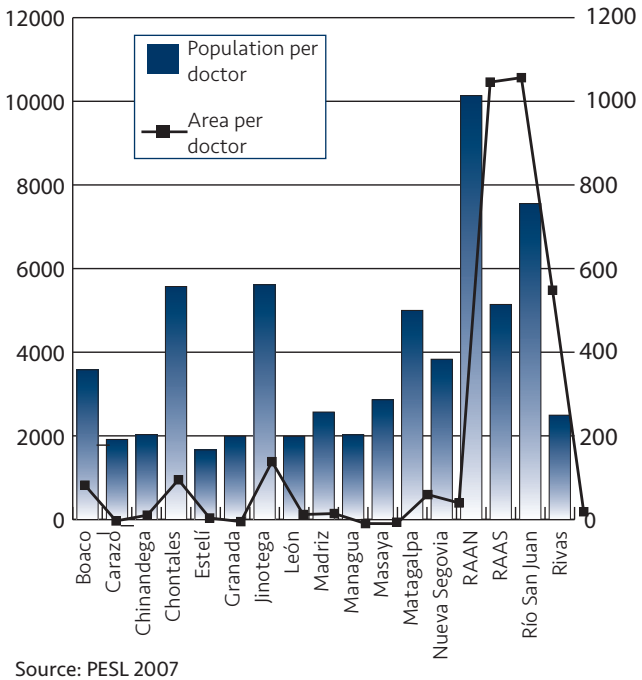
Part of the reason for the disparity in health personnel coverage is financial. The salary structure for health care personnel is set by MINSA and standardized nationally, but MINSA does not provide financial incentives for staff to work in remote and difficult-to-access areas, such as the Caribbean Region or some areas of Jinotega. Furthermore, although the cost of living is substantially higher in the Caribbean Region, because most goods have to be sent there from the Pacific side of the country, MINSA does not adjust salary levels to compensate for cost of living differences.

FIGURE 11. **Population and area served per nurse by SILAIS.**



Source: PESL 2007

FIGURE 12. **Population and area served per doctor by SILAIS.**



Source: PESL 2007

Another important issue is that the salaries received by Nicaraguan health workers are the lowest in Central America. The following are typical monthly salaries for MINSA health staff:[21]

- Medical specialists US$732–786
- General practitioners $544
- Registered nurses $210
- Auxiliary nurses $150
- Registered laboratory specialists $210
- Laboratory technicians $130

In comparison, salaries for general practitioners, for example, are substantially higher in neighboring countries:[16]

- Guatemala US$789
- Honduras $1,332
- Costa Rica $750
- El Salvador $969
- Panama $1,025

Even within Nicaragua, average salaries for health workers are lower than those received by other public- and private-sector workers:[20]

- Financial US$599
- Electricity $302
- Commerce $289
- Mining $284
- Transportation $245
- Construction $211
- Manufacturing $130

The low salary levels for public-sector health care personnel, high internal migration, and the frequent reorganization of personnel within MINSA with every change of government result in disruptively high turnover rates. Retaining staff and maintaining good morale also become challenging when salaries and appointments to key government health posts are based on factors other than technical and professional requirements.[3]

At the policy level, the standard for health care services is set by the Family and Community Health Care Model, under which a team of one doctor and two nurses provides medical attention to a portion of the population and visits the homes of those families under its care at least once every three months. Given the chronic understaffing of health facilities, however, the mandated field visits are not consistently done, especially in remote locations.[3]

"When the personnel conduct community visits, the health clinic is left without any staff." (Pearl Lagoon Health Center, RAAS)

All of these factors, plus limited opportunities for training and insufficient systems for appropriate monitoring and evaluation, have led to inconsistent levels of service, low morale in the sector, and a distribution of human resources that does not reflect regional needs.[3]

Basic infrastructure and medical supplies

In addition to limitations in terms of human resources, many health facilities face serious infrastructure needs. The most recent health services survey conducted by MINSA in 2001 (Appendices 9–15), showed that almost 35% of health facilities nationwide do not have access to electricity, and 45% do not have water.[18] Among those lucky enough to have a water supply, about half have water for four hours or less every day. Waste management is another area that could use improvements, with 35% of the facilities needing to have a sanitation and sewerage system installed or repaired. Only 70% of health units have incinerators, and 68% do not have a sterilization system.

Access to medicines has been a critical issue since the early 1990s, when the practice of providing free medicine in public sector health facilities was decreased. The priority went to inpatients at hospitals, and for women and children consulting at health care centers. Even then, the list of medicines carried by the health facilities is quite limited (Appendix A-19), and stockouts are common. As a result, the cost of medicines—one of the most significant components in the health care cost structure—was transferred to the patients' families. The relative high cost of medicines represents an important barrier to treatment for the vast majority of Nicaraguans, and many patients either purchase only part of what they are prescribed or nothing at all.

The Nicaraguan pharmaceuticals market is characterized by a lack of import controls, aggressive promotion of prescription and retail sales of brand-name drugs by distributors and manufacturers, profit margins that are not controlled by any regulatory authority, and a lack of market price competition. The Ministry of Finance, Industry, and Commerce establishes the price of each medicine based solely on information from the importer, without comparing it to equivalent products on the market. Furthermore, certain cultural factors and disinformation lead to irrational use of medicines, generating demand that favors the uncontrolled opening of pharmacies and other points of sale, such as markets, supermarkets, and small grocery stores.3

A 2007 study that compared prices of 20 medicines in Central American countries revealed that Nicaragua had the lowest prices for both brand-name and generic medicines. For example, Diclofenac sold at $0.07 in Nicaragua compared to $0.41 in Panama.[21] However, while the actual price may be less, the relative cost for Nicaraguans is still high, given that salaries are lower in Nicaragua than in other Central American countries.

The replenishment of medical materials (pharmaceutical, laboratory, and expendable medical materials) is managed by the Center of Health Supplies (Centro de Insumos para la salud-CIPS). Distribution to various MINSA units follows an annual schedule based on productivity indicators and an established budget. The Center furnishes restocking supplies on a quarterly basis. It is responsible for clearing supplies through customs, storing them as appropriate, and distributing medical and nonmedical supplies to all MINSA health units (SILAIS, hospitals, and health centers). A list of basic drugs to be provided to the different health care levels is included as Appendix A-19.

Laboratory services

National Diagnostic and Reference Center

The National Diagnostic and Reference Center (CNDR) is the apex referral laboratory in Nicaragua. It carries out research, drug analysis, virus and parasite detection in vectors, and diagnosis of etiological agents causing diseases in humans and animals. It also standardizes protocols and diagnostic algorithms, provides training and refresher courses for national laboratory technicians, and conducts quality assurance of the laboratory network's detection of priority disease agents.

The following are some of the CNDR's research and diagnostic capabilities:

- Studies of TB susceptibility to various drug treatments.
- Mycobacterium culture using the Kudoh medium method.
- Thin-layer agar medium for TB diagnosis.
- Studies of the sensitivity of molecular and parasitological techniques to diagnose leishmaniasis.
- Biogeographic research of the distribution of Triatoma dimidiata in Nicaragua for a Central American study.
- Studies of dengue, including work on evidence-based interventions for prevention and control.
- Sentinel site studies for the active surveillance of influenza.

The CNDR offers 128 diagnostic determinations, including blood chemistry, virology, bacteriology, and parasitology.[22] It has a staff of 148, of which 70% are laboratory professionals and 30% are administrative and technical staff.[d]

In the past few years, support from peer institutions, donors, and budget resources has allowed new technologies to be introduced for the diagnosis of epidemic, chronic, transmissible, and noncommunicable disease manifestations such as dengue, HIV, cytomegalovirus, hepatitis, herpes, cardiovascular diseases, and tumors. New technologies have also been introduced for the assessment of food, water, and drugs.

The Applied Entomology Area is now equipped with technology to detect parasites in the Chagas disease vector and also has the ability to conduct taxonomic classification of medically relevant vectors (malaria, dengue, leishmaniasis).

Regional laboratories

In addition to the national laboratory, Nicaragua also has two regional laboratories in Granada and Matagalpa. Founded more than 18 years ago, the regional laboratories have their own annual

[d] Personal notes from interviews with management from the National Diagnostic and Reference Center.

budget, staff, independent facilities (not linked to any hospital), and a specific list of assays and services offered. The services include bacteriology; virology; hematology; urinalysis; quality control for malaria and TB programs; and ELISA tests for dengue, Chagas disease, leptospirosis, and HIV. The laboratory in Granada also does food analysis and supports outpatient services in the hospital. The laboratory in Matagalpa performs leishmaniasis quality control. (See Appendices 16 and 17 for more information.)

Departmental (SILAIS-run) laboratories

The SILAIS facilities in Jinotega, Chontales, León, Madriz, and Nueva Segovia are equipped with departmental laboratories. These SILAIS-run laboratories were created in the mid-1990s to support epidemiological efforts and have broadened their services based on local health needs (Appendix A-7).

Services offered by these laboratories include malaria quality control; HIV testing; and ELISA tests for leptospirosis and Chagas disease; as well as bacteriology, hematology, urinalysis, and blood chemistry services. Some laboratories are better equipped than others. For example, the departmental laboratory in León also performs ELISA-based tests for dengue, analysis of iodine content in salt, and cholinesterase enzyme measurement. At present, however, it is not receiving the necessary reagents and has stopped assessing blood chemistry.[24]

The Chontales and Madriz laboratories do not perform bacteriology or chemistry tests but do receive samples from the health centers for the other tests mentioned above. The Nueva Segovia laboratory is not doing water bacteriology due to a lack of reagents, and the Nueva Segovia and Madriz facilities do not do dengue tests because they send them to the Estelí or Managua hospitals (Appendix A-8). [24]

Hospital-based laboratories

Laboratories are also located inside each of the country's 32 hospitals. In the RAAN, the RAAS, Boaco, Chinandega, Estelí, Masaya, Rivas, Carazo, and Río San Juan, the hospital laboratories also serve as departmental laboratories, with the added responsibility of diagnosis and quality control for priority diseases. Their services include hematology, blood chemistry, bacteriology, urinalysis, serology, and ELISA for HIV. In Estelí, Chinandega, and Bluefields, these laboratories also offer ELISA tests for dengue fever.[24] (See Appendices 20 and 21 for more information.)

Health center-based laboratories

The health center-based laboratories provide only limited services such as microscopy for TB, thick blood smears for malaria, rapid HIV/AIDS testing, serology, urine and feces tests, hematic biometry, and blood chemistry analysis (mainly creatine and glycemia). A total of 72% of health centers have laboratory services, a figure that drops to 17% among all health facilities, given that none of the health posts have such services.[17] In recognition of the lack of capacity in many health units, new training courses are being provided, especially for more remote regions. In the RAAN SILAIS, for example, training courses were provided in 2008 for 15 health center auxiliary nurses to perform tests to confirm malaria and other diagnoses, as well as basic general tests. Other SILAIS, such as Jinotega and Matagalpa, plan to continue this strategy in remote locations.[d]

Health information system

MINSA has instituted a number of epidemiological and service data gathering and management systems.

The National Planning and Development System's Statistical Unit

The National Planning and Development System's Statistical Unit receives monthly consolidated reports from each SILAIS using data sent from the primary and secondary health care units under its jurisdiction. The reports include mortality rates and the incidence of diseases for which notification is compulsory (see Appendix A-13).

The reports also contain statistics on monthly medical consultations, hospital discharges, specific program activities (such as immunizations, women's health care, children's health care, and the programs for chronic disease patients, TB, and malaria), support service activities (e.g., laboratories), environmental hygiene, and zoonoses.

National Epidemiological Surveillance System

The National Epidemiological Surveillance System is critical for informing timely decision-making, particularly for implementing immediate actions to control sources of infectious diseases.

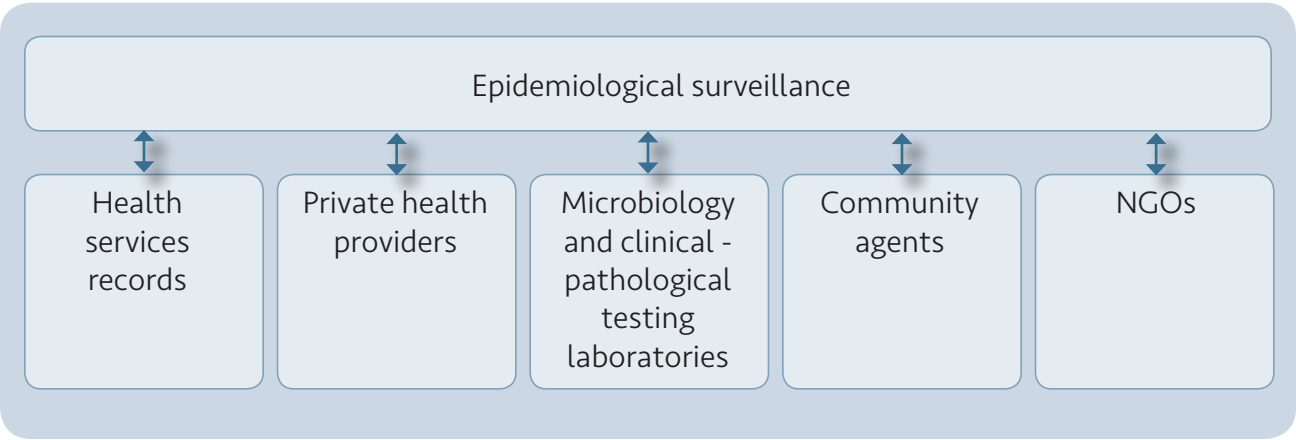
The objectives of the National Epidemiological Surveillance System include: [24]

- Conducting systematic monitoring to provide timely detection and information on events that affect the public health situation.
- Providing required guidance and support in relation to any disease or risk factor.
- Providing all health system levels with feedback on health issues, establishing major epidemiological risk-reduction activities and prevention and control measures, as appropriate.
- Supporting health care service planning and delivery in accordance with the target community's epidemiological profile.
- Prioritizing areas for health research.

The National Epidemiological Surveillance System receives daily and weekly reports on priority pathologies that have been reported by the MINSA service network, private health units, and community networks using mortality and morbidity forms (Figure 13 and Appendix A-14). An epidemiological alert is triggered when a suspected case is reported or confirmed and immediate investigation and/or control steps are taken. Information flows from the reporting source to the municipal surveillance unit, which sends an alert to the technical staff responsible for implementing control actions and submitting reports to higher-level decision-makers.

In addition to these general mortality and morbidity forms, some disease control programs have their own forms, which collect complementary information and are used to carry out their own analyses. For example, the system includes special forms for certain diseases such as HIV/AIDS, whose program has an epidemiology surveillance form for second-generation information, while the vector-borne program registers dengue and malaria on its own epidemiology form. Although a great effort is made, in reality not all of the information is systematically shared and analyzed by the different programs and health care levels. At the health-post and health-center level, staff members are required to produce different reports for different health ministry programs at different moments. The result of all of this is what can be described as a "fragmented" information system.

FIGURE 13. **Sources of information for the Nicaraguan epidemiological surveillance system.**



Policies and trends

Background

In the past three decades, tremendous changes in the political landscape have led to the reorganization of the Nicaraguan health system. In the late 1970s, the Sandinista National Liberation Front (FSLN) overthrew the Somoza regime, which had been in power for more than 45 years. The FSLN government nationalized most of the country's industry and revamped the national health policy.[25]

The Sandinista government created the Unified Health System, a national health system that unified all private and public providers under Ministry of Health management. The intended result of this policy was universal access to health care through the public sector.

The FSLN was defeated in elections in early 1990. In contrast to the socialist policies of the Sandinista government, the subsequent governments implemented more market-oriented economic policies.[26] Health policy changes during this period included increasing private-sector activity and decentralizing publicly provided health services, including the creation of the SILAIS.[27] The responsibility for financing health services for people in the formal economic sector was shifted to the INSS, although some of this is provided through MINSA hospitals on a fee-for-service basis.[15]

The FSLN returned to office in 2007 and national health policy was once again readjusted. The new government has increased restrictions on the private sector's role in providing health services, removed user fees in public health facilities, and added a significant community outreach component. This recent reorganization will require significant capacity building and the allocation of additional resources to achieve its goals. Additional personnel is especially needed as the community outreach component places additional demands on an already under-resourced health care system.

Health care spending

Nicaragua spends 8% of its GDP on health care,[28] and its per capita health care expenditure of US$59 is the lowest in Central America. Annual out-of-pocket spending on health is approximately $27 dollars per person, with the remaining $32 covered by public funds and other sources. About 48.5% of health spending comes from the national budget and 51.5% from private sources, of which 47% comes from household spending[16]A rise in out-of-pocket spending in recent years coincides with increased use of private health care facilities.[3]

Funding for the Ministry of Health is approved and disbursed annually. National health expenditure was approximately $211 million in 2007. Of this amount, 79% came from public revenue, including 67% from the treasury, 9% from debt relief, and 3% from internal funds (license payments, selling of services, etc.). The remaining 21% of the national expenditure came from donations (15%) and loans (6%). (See Appendices 24 and 25 for more information.)

Public funds primarily cover current expenses, whereas capital expenses and investments rely largely on external sources of funding. A total of 89% of the national health budget goes toward current expenses, with 11% for capital expenses. Within current expenses, 60% is earmarked for personnel services (mostly payroll), 25% for materials and supplies, 10% for non-personnel services, and 5% for current transfers.30A significant proportion of expenditure is earmarked for medical supplies and curative services, although MINSA has been decreasing the total budget allocated for the purchase of medical supplies.

The financing and resource allocation mechanisms are based on the previous year's numbers rather than productivity indicators. As such, they are not very responsive to trends and emerging local health needs. This also tends to institutionalize

chronically low spending in certain parts of the country, such as Jinotega and Matagalpa, which have traditionally received the lowest per capita budget allocation.[3]

A number of nonprofit organizations work in Nicaragua (Appendix A-17), many of which are funded through external assistance. However, a worrying recent development is the downward trend in foreign cooperation for the country's public health sector. Given that Nicaragua already has the lowest per capita health expenditure in Central America, this is especially significant. Twenty one percent of total spending and more than 80% of health investments (in areas such as equipment and infrastructure) are from some form of external assistance. With decreasing public funds, there will be additional pressure on households to increase out-of-pocket spending. Nicaragua already ranks third in the region for highest private expenditure (out-of-pocket costs), which is a heavy burden given the lower salaries in this country.

New health care models

In April 2007, the government of Nicaragua established a new national health policy to help "enforce the civil right to free health services for all." The new Family and Community Health Care Model shifts the traditional health care model (a curative, fragmented, and individualistic approach) to a comprehensive family- and community-oriented one that stresses disease prevention and healthy living conditions. It also attempts to coordinate public- and private-sector efforts and launch health interventions in accordance with the prevailing geographic, political, cultural, and ethnic characteristics of each target location. The underlying principle for the new model is sustainable human development. The model aims to link the efforts and resources of institutions both inside and outside the health sector in coordination with an organized social sector.[e] The idea is to develop community-level capabilities to encourage healthy practices and the creation of healthy environments. The emphasis is on the active involvement of citizens, thus ensuring good governance and social control over ongoing and planned health programs. The new health model is intended to be multidimensional, integrating family, society, and the environment with a long-term vision of sustainable human development and poverty reduction.[30]

The new policy has the following strategic goals:[31]

- Reverse the privatization of health care services, ensuring free, high-quality, customized, and respectful care.
- Develop disease prevention activities by coordinating work among government agencies, the wider community, and civil society.
- Shift the individual-based, curative model of medical care to a family-based model that embraces a holistic community and environmental approach, highlighting health education, disease prevention, health promotion, and the implementation of differentiated interventions to prioritize and meet the needs of the most vulnerable populations.
- Tailor interventions to suit the prevailing geographical and cultural characteristics of target populations.
- Overcome shortages of medical supplies in health units, including drugs and consumables.
- Improve the basic conditions and infrastructure in health units.
- Develop a health personnel education and training plan to make actions sustainable.
- Regulate health insurance providers, so they provide workers with high-quality health services and increase social security membership.
- Link and harmonize external cooperation in line with the health policies and the population's most urgent needs.

[e] Newly established Councils of Citizens' Power are the local bodies promoted by the FSLN government to implement its citizens' participation scheme.

Unmet clinical needs

As a whole, the country has many unmet clinical needs. Some areas are more vulnerable than others, and needs differ depending on the type of facility and its level within the health care system. Below we present the findings from individual interviews and group discussions held during three rounds of field visits between May and October 2008 organized by health care level (primary health care clinics, hospitals, and the central administrative level).

Primary health care level

At the primary health care level, there were three main categories of diagnostic needs expressed by the respondents.

1. Expanded diagnostic capacity. About 60% of general medical consultations take place at the primary health care facilities. However, the availability of laboratory services is generally limited at this level. Informants reported that health clinics should be able to provide higher-resolution diagnostic tests, such as protein, glucose, liver tests, basic hematology, and blood chemistry, particularly for pregnant women.
2. Diagnostic tests for sexually transmitted infections. Vaginal discharge and dysuria (painful urination) are common causes for consultations, and both sexually transmitted infections (STIs) and urinary tract infections require proper diagnosis and treatment. Pregnant women are also at greater risk of premature birth and abortion due to such infections. To ensure appropriate management of both pregnant and nonpregnant women (and their sexual partners), and to reduce complications, primary-level clinicians should be able to identify pathogens related to sexually transmitted and urinary tract infections.

"Rapid tests are already a priority, and there is a great interest in being able to test for HIV, syphilis, and other sexually transmitted infections." (HIV Program, Managua).

3. Diagnostic tests for the main diseases affecting children. The nurses and doctors based at the country's health posts and health centers expressed that rapid diagnostic tests to identify pathogens causing respiratory infection, diarrhea, and fever among children are urgently needed. Currently, diagnosis is based primarily on clinical symptoms. Inability to arrive at a conclusive diagnosis could lead to either the delayed start or unnecessary use of medication. As previously mentioned, pneumonia and diarrhea are among the leading causes of child consultations and hospitalization (10% of admissions). Pneumonia is the main cause of infant mortality, and children living in rural areas and the Caribbean Region are most affected by seasonal outbreaks, whose effects are compounded by lack of access to quality health care.

"We have problems defining the causes of respiratory infections and diarrhea because final diagnoses are only done at sentinel sites. For rotavirus, we send samples to the hospital laboratory." (Granada Laboratory, Nicaragua)

Hospital care level

Hospitals require tests to help respond to medical emergencies and to provide specialized services to hospitalized patients.

1. Chemical tests for pregnant women. Maternal mortality tops the list of health priorities in Nicaragua. Indeed, maternal-related health issues are the most common reason for hospital admissions (29%), with postpartum hemorrhage, hypertensive diseases, and sepsis the leading causes of maternal mortality. However, informants at hospitals often reported a lack of appropriate emergency medical care for obstetric complications such as postpartum hemorrhage. They also reported a lack of more routine tests, including those for electrolytes and for various proteins, which are used for

the management of post-partum hemorrhage and the evaluation of hypertensive diseases in pregnant women, respectively.

"In this hospital, we need tests for women and children, including pre-eclampsia for pregnant women.... Some time ago, a woman was suffering from postpartum hemorrhage. We didn't have access to serum electrolyte analysis and had to send her [right across the country] to Managua." (Bluefields Hospital, RAAS, Nicaragua)

2. Reducing newborn morbidity and mortality. Nicaragua has a persistently high rate of infant mortality, mainly as the result of neonatal mortality. Low birth weight, prematurity, neonatal sepsis, and congenital malformations are the most important causes of neonatal mortality. However, the lack of diagnostic capacity at all health care levels means that many of these causes are not properly investigated or diagnosed.

Hospital informants noted that they need to be able to identify the pathogens affecting newborns, including those in the TORCH complex (toxoplasmosis, other infections, rubella, cytomegalovirus, herpes simplex virus) and other infectious agents that affect pediatric patients, such as meningitis, influenza, mononucleosis, syphilis, pneumonia, and rotavirus. With regard to bacteriology, increased capacity and reliability is required for culture capabilities (hemoculture).

3. Proper management of HIV cases. An increased hospital diagnostic capacity to conduct CD4 counts and viral load measurement is urgently needed for proper management of patients receiving antiretroviral treatment and for the detection of opportunistic infections. There were also concerns noting the need to investigate suspected resistance to antiretroviral (AR) drugs.

"The concentration of services in Managua creates a barrier to AR follow up. Chinandega already has a large number of cases and there should be similar diagnostic capabilities in Chinandega as well." (La Mascota, National Children's Hospital, Managua)

4. Specialized blood chemical testing for hospital care. Special blood chemical tests are commonly performed at laboratories in the national referral hospitals located in Managua. Although these tests are free of charge, patients who do not live in Managua have to travel to and find accommodation in the capital city to be tested. This situation increases patient out-of-pocket spending and leads to delays in diagnosis and treatment.

   There is a great need for chemical diagnostic tests for all in-hospital patients, including newborns, children, and adults. Hospitals require tests for gasometry; to determine serum electrolytes and specialty chemicals (iodine, lipids); to test for hormones and enzymes (LFTs, cardiac, thyroid, prostate); to identify pathogens among newborns and children; and to provide more reliable results for bacteriological studies.

Central administrative level and the CNDR

1. Fevers and the elimination of malaria. Every year, Nicaragua conducts about half a million tests for malaria as part of its surveillance system. However, only 1 in 500 turns up positive for malaria and no cause is identified for many of the remaining febrile cases. The World Health Organization has warned of the need to pay attention to the presence of new pathogens that have not been well investigated and could emerge as global diseases.

   At the central administrative level, there is consensus among program directors and technical staff over the great need to study febrile cases to identify pathogens that generate high morbidity and contribute significantly to infant and overall mortality, as well as to monitor emerging pathogens of epidemiological importance.

"Here in Carazo, there haven't been any positive results for malaria, but we keep taking blood samples from fever cases. However, the majority of these cases are urinary infections. In some cases we never determine the cause of the fever; we believe some viruses might have been the cause."

"We need to increase the differential diagnosis of febrile diseases, such as western encephalitis virus, influenza, infectious mononucleosis, parvovirus B19, hantavirus, West Nile virus, leptospirosis, Chagas disease, brucella, and respiratory infections." (CNDR Virology Department, MINSA Central, Managua)

2. Respiratory infections. Nicaragua has only three sentinel sites nationwide for surveillance of respiratory infections, all of them located in the Pacific Region, with two in Managua and one in Masaya. The second most important need identified by informants at the central level is to strengthen the health system's diagnostic capability to determine the causes of acute respiratory infections, which is the main cause of consultation among children.

"We are interested in multiplex for respiratory diseases caused by RNA viruses—influenza A and B, respiratory syncytial virus, parainfluenza 1,2 and 3, metapneumovirus, human picornavirus, rhinovirus, enterovirus and coronavirus—as well as adenovirus." (CNDR Virology Department, MINSA Central, Managua)

3. HIV, STIs, and TB. HIV testing and monitoring was one of the top needs mentioned. There should be increased decentralization, while developing an increased capability for more simple diagnostic techniques, particularly viral load measurement, the CD4 count, and identification of opportunistic diseases. MINSA central needs to strengthen surveillance of AR drug resistance.

"There are no studies assessing [antiretroviral] compliance, acceptance, and drug resistance. Follow-up for people receiving AR is only available in Managua, which significantly restricts access. Patients receive their results after a long delay, and there are great concerns about the quality assurance procedures." (Asonvihsida, Managua)

"We have a great need to assess AR failure and to study AR drug resistance." (CNDR Virology, MINSA Central, Managua)

In addition to HIV testing, informants also noted that a rapid tool for the immediate identification of multiple STI would be extremely helpful. Drug-resistance monitoring and a faster diagnostic tool were also important for the TB program.

4. Chagas, dengue, leishmaniasis, and leptospirosis. Tropical diseases are one of the five health priorities in Nicaragua because of their geographical distribution and the potential for epidemics and outbreaks. Advances have been made in terms of surveillance and the development of new tests for these diseases, but particular challenges still remain.

   For instance, the true magnitude of Chagas disease has still not been very well defined in Nicaragua because of underreporting of cases. While it is considered endemic, with a higher prevalence in certain areas of the country, the disease is "practically invisible." It is difficult for health staff to diagnose suspected Chagas cases, and there are, therefore, no reliable data on morbidity and mortality related to the disease. Meanwhile, dengue has reached epidemic proportions. Every year, there is a large number of suspected dengue cases, but only 30% of these febrile cases are confirmed as dengue, with no conclusive diagnosis for the rest. And finally, leishmaniasis is also endemic to the country and has produced alarming epidemic outbreaks in some regions, particularly in Jinotega, the RAAN, the RAAS, and Río San Juan.

   More sensitive, less invasive tests are required to detect leishmaniasis at any stage in its development, as well as dengue and Chagas disease during their acute stages. The tests currently available are serological and are ineffective during the first days after infection. There is also a need to simplify and increase the availability of tests for leptospirosis.

5. Environmental health. MINSA Central and the SILAIS conduct a series of routine activities related to control of diarrhea and poisoning that are extremely important in terms of public

health. There is a need for simplified means for conducting certain tests, including monitoring food, water, and contamination with heavy metals.

TABLE 3. **Summary of user requirements and desired specifications.**

Requirements	Specification		
	Primary health care level	Hospital	CNDR
Power source	Off-grid, such as solar, or rechargeable battery	Not specified	Not specified
Water source	Clean water is not needed or must be supplied with the test	Not specified	Not specified
Temperature	Must be thermostable (does not require cold-chain handling)	Not specified	Not specified
Disposal	Must be easy to dispose, and must fully self-contain all biological hazards	Must be easy to dispose, and must have clearly explained protocols	Not specified
Shelf stability	Long periods	Not specified	Not specified
Maintenance	Minimal	Minimal Staff should be able to maintain	
Training	Should be easy to use and results easy to interpret Target user is a minimally trained health care worker	Should be provided to staff	Not specified
Turn-around time	Within minutes	Not specified	Not specified
Packaging: Batched versus single samples	Single samples preferred	Batch preferred	Not specified
Multivalent versus univalent	Multivalent preferred	Multivalent preferred	Multivalent preferred
Sensitivity / Specificity	Not specified	Not specified	High levels
Cost	Low cost	Low cost	Low cost

User requirements

The dearth of basic infrastructure and chronic under-investment in health care facilities makes the installation of new laboratories an impractical solution. However, the introduction of easy-to-use, point-of-care, or near-patient diagnostic technologies that do not require extensive laboratory infrastructure would greatly improve diagnostic capabilities and have a significant impact on the quality of health care provision. New diagnostic technologies should have the features outlined below, depending on the health care level, to maximize their utility to the user and the patient.

Primary health care level

Simple and robust. Given the barriers to health care access reported by informants and the extremely limited laboratory infrastructure, an ideal diagnostic test at a primary health care facility should be simple, robust, and have minimal infrastructure requirements. As previously discussed, almost half of the health facilities do not have a water supply, and 35% of health facilities in rural areas do not have a reliable electricity source, particularly in the Central and Caribbean regions.

"We have electricity for 20 hours [sic] a day. There are blackouts from 8 am to 4 pm. If there is no fuel for the town's electricity plant, then we spend several days with no electricity. We have no backup generator and the microscope is electrical. There are solar panels, but they haven't been installed. For water, there's a well here at the health center, but the water quality is unknown." (Pearl Lagoon Health Center, RAAS)

"Rapid HIV tests have reached the health centers but not the health posts. The main limitation is guaranteeing a cold chain to preserve the rapid test." (SILAIS epidemiologist, León)

If instrumentation is required, compatibility with an alternative source of power such as solar energy should be considered. Indeed, there have been positive experiences using solar-powered refrigerators for vaccine storage in health centers and health posts in the RAAN and RAAS, although maintenance has been a problem.

Medical waste management is another critical issue to consider. Many health facilities do not have a properly functioning system, with the situation particularly difficult in the RAAN, where fewer than 20% of health facilities have proper waste management in place.

Stable and low maintenance. Budgetary constraints can hinder the effective and consistent provision of medical supplies and the maintenance of equipment. As such, an important feature for a new test would be thermal stability and long shelf life, given the irregularity of the supply chain, especially for rural and remote areas. Associated instrumentation should have a long mean-time-between-failure specification and require minimal maintenance. Many pieces of equipment, even basic ones, can sit idle for long periods of time without being fixed, due to limited equipment maintenance budgets and a lack of skilled service technicians in the country.

"Electricity is reliable, but there is no refrigerator, which has been broken for over a year..." (Health post in Lake Apoyo, Masaya)

Easy to use and interpret. Most of the specialized laboratory personnel are concentrated in the Pacific Region. Apart from a few nurses and general practitioners (doctors), health care personnel in underserved rural communities in Nicaragua's Central and Caribbean regions are likely to be volunteer collaborators and traditional healers. New diagnostic technologies should be accessible to these minimally trained users, with features that are easy to use, require few steps, and have results that are easy for anyone to interpret.

Quick turn-around time and multivalent capabilities. Considerable geographic barriers and/or expensive transport in many areas of Central and Caribbean Nicaragua make it problematic for patients to seek consultation for a health problem and return for follow-up. New diagnostic technologies should provide a result within minutes, and, if possible, multivalent capabilities for multiple concurrent diagnoses so that there is no need for repeated visits. For rural and remote clinics with relatively low patient traffic, the preference would be individually packaged tests. The individual presentation will allow one test to be used at a time, if necessary, removing the need to "batch" patients when there is a limited number of cases. However, the tests should be delivered in bulk to the health facility to avoid the problem of stockouts due to supply problems.

Hospital care level

Automated hematology device. Given the volume of hematology work in hospitals, informants asked for equipment with automated processes or batch capabilities. And since there are serious limitations in terms of technical services, ideal diagnostic equipment should require little or no maintenance. In the case of more complex equipment, staff should receive adequate training to keep it in an optimal condition. Considering the difficulties related to waste disposal, the diagnostic kit should include a waste disposal protocol and device.

Central administrative level and the CNDR

Performance requirements and introduction considerations. The CNDR expressed a high degree of interest in a multivalent diagnostic test. However concerns were raised regarding the sensitivity and specificity levels needed when testing several pathogens simultaneously.

When introducing a new diagnostic test, the CNDR will require a review of protocols for performing the test and algorithms for how the test results will be used. Furthermore, staff must be adequately trained, while quality control processes will need to be set up at the point of use of the diagnostic test (either at the hospital or health clinic) and coordinated at the central CNDR level. The new diagnostic tests should dovetail into existing health information systems. Lastly, there must be a viable treatment plan available to the health care provider for whatever disease he or she is diagnosing.

"Microscopy is our standard diagnostic method for malaria, but we have problems with quality control and the standardization of reagents, and the staff needs training. We have been using rapid tests for malaria, but we have not studied what impact they have really had." (CNDR, Managua)

"We lack an official guide on rapid tests for suspected cases of malaria." (León SILAIS, Leon)

Affordability and sustainability. The issue of cost must be addressed when developing a new test. Out-of-pocket expenditure is already a heavy burden on individuals and their families, making Nicaragua the country with the third-highest private health expenditure in Latin America and the Caribbean. The challenge is to create a test involving low-cost technology and demonstrated cost-effectiveness so that significant investment can be secured for coming years.

Table 3 provides a high-level summary of user requirements and desired specifications per level of the health system. Further studies are needed to define the exact parameters per each requirement.

Barriers and facilitating factors for new diagnostic tests

Barriers (primary health care level)

Infrastructure. A large proportion of the health facilities in many areas have no access to reliable sources of electricity or potable water, and they have inadequate disposal systems. They also lack backup systems to ensure continuity of basic services (water, electricity, communications) during service interruptions that can be frequent and long-lasting.

Geographical access. The Central Region and the autonomous Atlantic regions (RAAN and RAAS) are vast, rural, and impoverished areas that lack basic services, including roads. The fact that only about 10% of the population lives in these regions has proved to be a persistent challenge in terms of health investment. Geographical access is difficult in the Caribbean Region, with either very high transport costs or no transportation options at all.

"Sometimes they have to fight with the airline company because they refuse to take a sick patient if the flight is full. In emergency cases, they sometimes have to wait until the morning when the first flight is available." (Bluefields Hospital, RAAS)

"There are no main roads connecting the Caribbean and the Central and Pacific regions. It takes days to reach Managua [a distance of less than 300 miles]." (Bluefields Hospital, RAAS)

Health information systems. The "fragmented" health information system (see explanation in the "Health information system" section) means that there is a long lag time for the transmission of information for quality control purposes and for returning diagnostic results to patients and health care providers. Monitoring and supervision processes are weak, and there is an inefficient flow of information to the laboratories from the thousands of volunteer collaborators in the community-based health network.

"A positive test result is provided to the patient with counseling. The whole process to get the positive result to the patient can take up to three months." (Health center, Managua)

"In some cases, in rural areas with difficult access, the whole process of sending and processing samples to confirm cases [of malaria] takes about 20 to 30 days. In some cases it takes up to three months for the col-vol to come to the health center and hand us samples and then visit the community again with the results." (Vector Transmitted Disease Program, MINSA Central, Managua)

Poor quality-control system. Both regional and departmental laboratories have quality control procedures. However, the quality control of laboratory performance is poor, particularly in the clinical area (hematology, chemistry, basic urinalysis, coproparasitology), which is also related to inadequate staffing and financing. One of the problems is that quality control activities tend to concentrate more on specific disease programs (e.g., Chagas disease, malaria, TB). This could in part be alleviated by providing more training for lab personnel. Lab proficiency is a critical issue as the successful uptake of diagnostic tests relies on health care providers trusting the results coming from the laboratories.

"Doctors feel that the laboratory is not well supported, that the technicians do not have adequate training, and that there are not very good quality control methods in place." (Bluefields Hospital, RAAS)

Shortage of trained personnel. Since staff distribution is primarily based on population size rather than morbidity and mortality indicators, most health care resources, including health personnel, are concentrated in the Pacific Region. Incomplete staffing levels mean that health personnel at health centers and health posts are overloaded performing public health and clinical care functions, and they are not trained for laboratory functions. In the Caribbean Region, the lack of infrastructure and the shortage of health personnel represent the biggest barriers to health care access among the inhabitants of the RAAN and the RAAS. Generally speaking, laboratories have restricted schedules and do not provide services at night or on weekends. MINSA could readjust the compensation structure that takes into account the higher cost of living in and transport to and from the Caribbean Region in order to make it easier to recruit health care personnel for the region.

"The main problem is that the staff at the health posts are not well equipped, so cases are not resolved at the community level. The patients' condition deteriorates, and they are very sick by the time they get to the hospital." (Pearl Lagoon Health Center, RAAS)

The shortage of trained personnel is also exacerbated by the high levels of turnover and frequent reorganization within MINSA with new government regimes. An additional pressure is the implementation of the new Family and Community Health Care Model, where health personnel are required to visit communities at least once every three months.

"When the personnel conduct community visits, the health clinic is left without any staff." (Pearl Lagoon Health Center, RAAS)

Irregular medical supply. As mentioned earlier, stockouts are very common at health facilities, especially at the lower levels of the health system (health centers and health posts). Laboratory supplies follow an established budget, and the diagnostic tests for certain programs tend to be prioritized. For those health centers with laboratories, the constant lack of reagents is a problem and represents an important barrier to POC tests. Reagents and supplies can be requested monthly, but several months can go by without any response. Further compounding the lack of access to laboratory services is the fact that none of the country's 814 health posts have a laboratory.

"If supplies are not provided, then the tests are simply not done. Samples can be sent to Managua, but this requires approval and a letter from the SILAIS director. For blood chemistry, for example, they get the results within one week." (Masaya Hospital)

"Granada, for instance, which has a more reliable laboratory supply, recently spent a period of time with 18 products out of stock. The problem is that these laboratory supplies rely largely on donations." (Granada Laboratory, Nicaragua)

Budget. Nicaragua is the second-poorest country in Latin America and the Caribbean, with the lowest per capita health investment. Public investment in health is very low, and the demand for health care is growing. Sustainability is paramount for any initiative aimed at creating new diagnostic tools, given that donations have been decreasing, while MINSA has been reducing the budget for purchasing medical supplies, and much of the laboratory funding comes through specific health ministry programs. The recent downward trend in foreign cooperation for the country's public health sector is also a looming problem. As it currently stands, 21% of total spending and more than 80% of health investments in areas such as medical and lab equipment and infrastructure come from some type of external assistance.

Facilitating factors

The community and family health care network. The new health care model being implemented by the current government represents a great challenge as it requires substantial reorganization of services and the retraining of all staff. The introduction of a new diagnostic technology could be seen as an opportunity to facilitate the new model's implementation. New tests should be designed as a community tool for health volunteers, families, and entire communities, particularly underserved ones. A new test that could identify several diseases or infections would help fill the gap in diagnostic resources, helping medical personnel to fulfill the new objective of comprehensive care for families, instead of only executing vertical program implementation for individuals.

Malaria elimination. Timely diagnosis and treatment must be ensured to sustain the downward trend in malaria-related morbidity and mortality. Significantly reducing the incidence of malaria is one of the 2015 Millennium Development Goals assumed by Nicaragua in September 2000.[f] During the past decade, national epidemiological surveillance revealed an ongoing reduction in the indicators related to illness and death from malaria, to such a degree that the country is moving toward the possible elimination of local transmission of this disease. It is important to highlight that this situation has resulted from strong community involvement in vector control and case detection, with communities, health personnel, and col-vols working closely on malaria treatment and follow-up, particularly in rural areas. Another facilitating element here has been the technical and financial support received for several years from cooperation agencies such as the PAHO and the Global Fund. The latter will continue for the next six years under the Axis of Prevention and Control of Malaria in Mesoamerica project. Lessons learned from the experience of eliminating malaria should be incorporated into the introduction plan of any new diagnostic tests.

[f] The UN Millennium Development Goals website: www.un.org/millenniumgoals/. Accessed in December 2008.

The network of community health volunteers. Given the shortage of health care personnel, the potential impact of introducing a new and simple diagnostic test may be determined by the thousands of volunteers and community leaders working on health promotion (including midwives, traditional healers, and brigadistas). The primary health care level has had experience in this respect through the introduction of the rapid test for malaria, which has been in the hands of community brigadistas and col-vols. Brigadistas and midwives are both embedded within the community and trusted after years of managing suspected cases of malaria and oral rehydration therapy, so the new information on a simple diagnostic test, and the test itself, could be deployed rapidly. There is also primary-level experience with HIV rapid tests, which are handled by community health post workers in remote areas.

"We have an extended epidemiological surveillance network. We collect blood samples to test malaria through a volunteer network of over seven thousand community collaborators." (Vector-borne Disease Program official, MINSA Central, Managua)

The network of health centers with a laboratory. Laboratories located in the main health centers have experience performing basic testing, such as general urine examinations, general stool examinations, hematic biometry, smears, and thick smears. These small laboratories should provide a useful referral point for col-vols when bringing a simplified diagnostic test to the community level, along with a simplified information system for monitoring supply and results.

At the hospital level. Hospital-based laboratories have a number of strengths, including that only more qualified personnel work there, they have a staff shift covering 24 hours to respond to medical and surgical emergencies, they have a dedicated cold chain for laboratory products, and they have higher-resolution equipment for performing diagnostic tests.

Monitoring by the CNDR. CNDR has accumulated more than 20 years of experience both supporting and supervising the laboratory network across the country and supporting day-to-day epidemiological surveillance and rapid responses to outbreaks. It has more than 100 differentiated diagnostics. The CNDR is helped by two regional laboratories that perform a list of specific confirmatory tests to support clinical work and epidemiological surveillance. It also collaborates with several international research institutions working on different tropical diseases. Its strengths could be of great value in ensuring calibration and gold standard measurement as well as in monitoring progress in the implementation and acceptance of new POC diagnostic tests.

Conclusions

This case study highlights many of the challenges that technology developers will face in developing and deploying new diagnostic tools within the current context of the Nicaraguan health system. The limited number of health personnel already overwhelmed by a heavy patient load, the highly inequitable distribution of health services resulting in large underserved communities, the high risk of frequent epidemic outbreaks, a fragmented information system, and the mandated implementation of a new health care model with inadequate financing top the list of major challenges. Some of these challenges can be addressed technically; others will require infrastructure and capacity building as a prerequisite; yet others will need a review of current health policies.

There are areas where introducing new and appropriate diagnostic technologies would clearly

have a positive impact, and we have preliminary information on desired feature sets. Future studies are needed to delineate the parameters for each user requirement.

There may not be one single product that meets all needs, however. The stated clinical needs and priorities at each level of the health system differ and so do the product requirements and user specifications. A one-size fits all approach will not deliver optimal results.

Nonetheless, a diagnostic test developed for use for primary health clinics in Nicaragua is likely to work in neighboring Central American countries. From the perspective of each level of the health system, many health challenges are remarkably similar: chronically under-funded health systems, uneven population distribution, susceptibility to epidemic outbreaks, staff shortages in remote clinics, vast underserved territories with under-equipped health facilities, and a fragmented health information system with limited epidemiological surveillance capabilities.

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Appendix

TABLE A-1: **Maternal and infant health indicators by administrative region, 2005**

Administrative region	Maternal mortality per 100,000	% newborns <2,500 grams	Infant mortality per 1,000
Nicaragua	86.5	8.4	33
Boaco	137.1	8.1	24
Carazo	0.0	12.4	44
Chinandega	44.3	6.8	28
Chontales	100.8	7.0	39
Estelí	0.0	9.4	23
Granada	80.2	8.2	25
Jinotega	143.3	9.6	36
León	43.0	8.7	24
Madriz	63.1	9.1	33
Managua	23.1	8.8	36
Masaya	31.3	9.6	25
Matagalpa	108.9	8.8	32
Nueva Segovia	57.3	10.4	28
RAAN	287.0	6.2	54
RAAS	198.9	5.5	39
Río San Juan	230.9	6.0	26
Rivas	125.3	6.2	14

Source: Ministry of Health.

TABLE A-2: **Leading causes of hospital admission in Nicaragua, 2007**

Cause	Total
Labor	57,385
Pneumonia	23,127
Complications in labor	13,540
Diarrhea	12,198
Placenta previa, premature detachment, and hemorrhage	9,658
Maternal assistance related to the fetus and amniotic cavity	9,515
Diseases of the appendix	7,331
Gall bladder, biliary ducts, and pancreas disorders	7,178
Diabetes mellitus	7,177
Infections of the prenatal period	6,471
Total of the first 10 causes	153,580
Total of all admissions	328,758

Source: Ministry of Health.

TABLE A-3: **Rates of chronic disease, cancer, and suicide (per 100,000) per administrative region, 2005**

Administrative region	Diabetes rate	Hypertensive diseases rate	Breast cancer rate	Cervical cancer rate	Suicide rate
Nicaragua	80.9	33.9	13.7	29.4	7.1
Boaco	39.1	20.9	0.0	15.0	5.9
Carazo	114.8	32.5	8.4	33.6	5.1
Chinandega	122.0	38.4	5.5	33.1	8.6
Chontales	29.6	14.2	7.0	18.7	4.2
Estelí	70.9	38.3	14.6	29.2	7.9
Granada	96.8	63.1	28.3	28.3	5.2
Jinotega	28.9	11.9	10.3	17.1	6.1
León	90.7	39.8	19.1	28.7	7.7
Madriz	12.8	19.3	0.0	19.2	8.3
Managua	113.0	39.4	23.7	34.1	8.1
Masaya	142.4	41.1	15.1	17.6	3.8
Matagalpa	28.9	21.5	6.5	42.1	11.4
Nueva Segovia	17.1	19.3	4.1	24.6	7.1
RAAN	47.3	30.6	0.0	32.0	2.9
RAAS	73.7	21.1	9.8	29.5	1.9
Río San Juan	17.6	23.4	0.0	24.5	7.3
Rivas	66.1	68.4	9.0	27.0	6.0

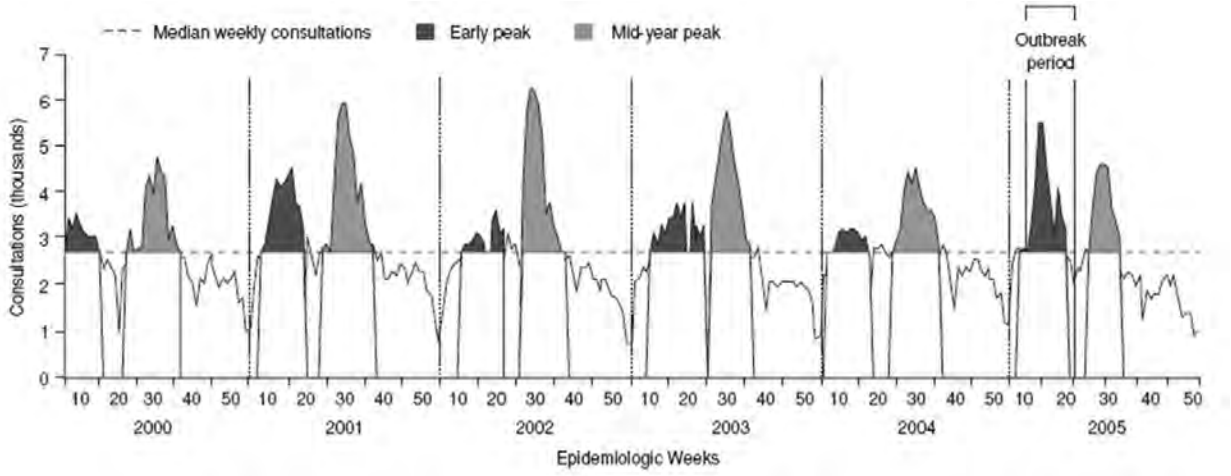
Source: Ministry of Health.

TABLE A-4: **Infectious disease rates (per 100,000) per administrative region, 2005**

Administrative region	Diarrhea rate	ARI rate	Dengue rate	Hemorrhagic dengue rate	Leishmaniosis rate	Malaria vivax cases	Malaria falciparum cases
Nicaragua	371	2,468	3.2	0.30	5.70	5,498	1,144
Boaco	419	2,986	1.7	0.20	0.95	82	17
Carazo	429	3,010	5.7	0.40	0.00	4	0
Chinandega	195	2,326	1.3	0.05	0.54	277	0
Chontales	244	1,512	2.6	0.22	8.25	280	20
Estelí	507	2,587	7.3	1.72	0.09	13	1
Granada	307	2,386	3.3	0.89	0.05	8	0
Jinotega	356	2,425	2.6	0.00	44.27	525	5
León	241	2,673	5.5	0.46	2.95	45	0
Madriz	438	3,290	5.9	0.00	0.08	1	0
Managua	347	2,074	2.4	0.43	0.14	149	16
Masaya	269	1,754	1.7	0.22	0.03	0	0
Matagalpa	518	3,541	3.0	0.19	9.92	1,247	71
Nueva Segovia	360	2,912	9.1	0.28	1.23	72	2
RAAN	662	2,198	0.1	0.05	18.76	1,609	857
RAAS	863	3,709	1.4	0.00	16.59	1,127	155
Río San Juan	582	3,070	2.3	0.00	13.61	50	0
Rivas	295	2,406	3.5	0.00	0.00	9	0

Source: Ministry of Health.

FIGURE A-1: **Trends in consultations for diarrhea among children < 5 years old, 2000–2005**



Source: Amador, et al.

FIGURE A-2: **Ministry of Health Organization Chart, 2008**

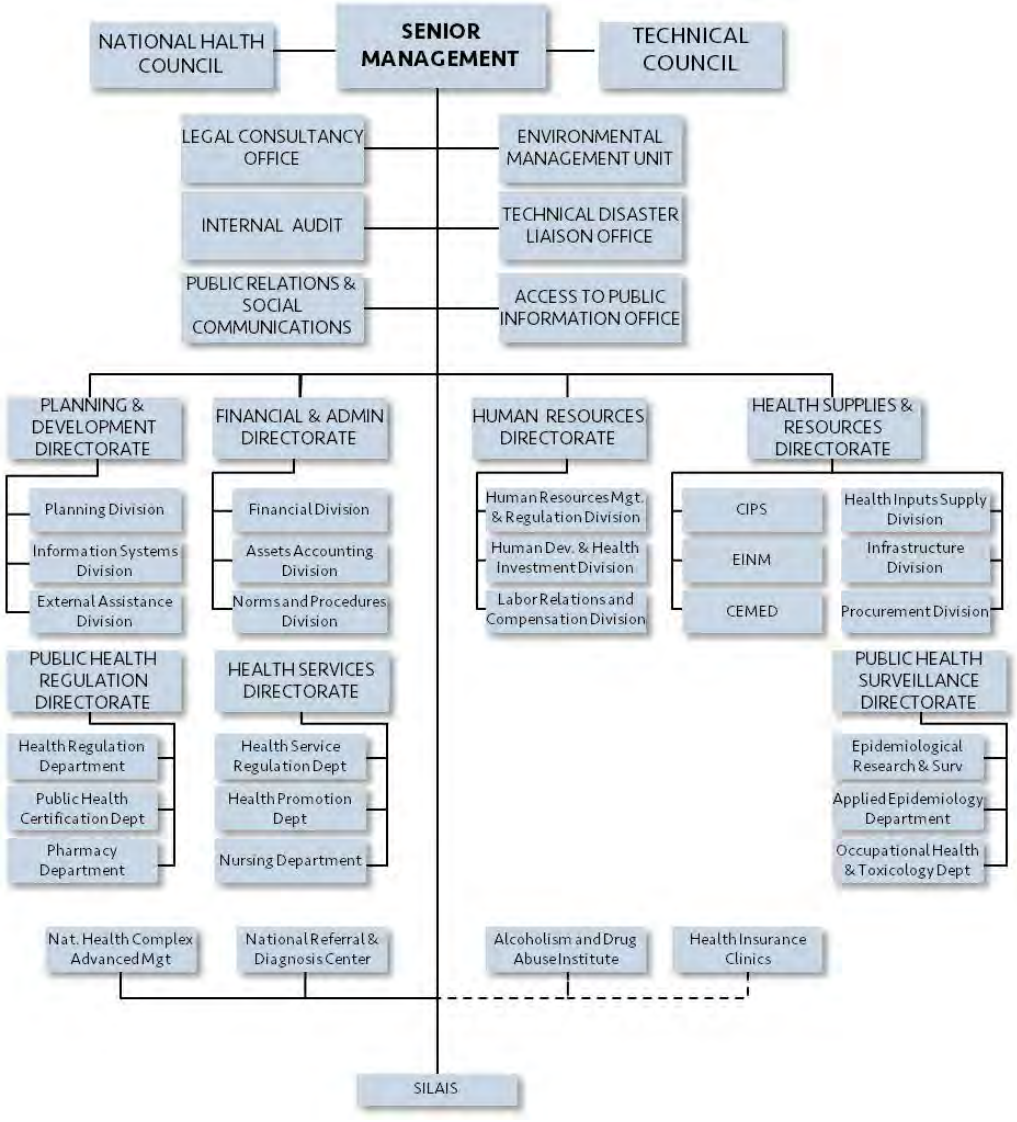


TABLE A-5: **Health care service network per SILAIS, 2007**

SILAIS	Department or national hospitals	Health centers with beds	Health centers with no beds	Health posts	Total
Boaco	1	1	6	23	31
Carazo	3	0	8	20	31
Chinandega	2	4	11	82	99
Chontales	1	3	12	62	78
Estelí	2	2	4	38	46
Granada	1	1	4	25	31
Jinotega	2	1	7	59	68
León	2	1	12	84	99
Madriz	1	0	9	23	33
Managua	9	4	16	91	115
Masaya	1	0	10	28	39
Matagalpa	1	2	14	75	92
Nueva Segovia	1	3	7	51	62
RAAN	2	4	1	103	109
RAAS	1	0	7	33	41
Río San Juan	1	0	8	29	38
Rivas	1	2	8	29	40
Total	32	28	144	855	1,059

Source: Local Sanitary Emergency Plans PESL 2007.

TABLE A-6: **Human resources distribution per SILAIS, 2007**

SILAIS	Admin	Auxiliary nurses	Registered nurses	Specialists	General practitioner	Dentists	Health technicians	Total
Boaco	209	134	16	6	40	5	95	505
Carazo	341	159	70	39	53	8	158	828
Chinandega	539	355	153	88	114	27	358	1,634
Chontales	416	258	35	25	36	0	170	940
Esteli	364	190	63	58	72	13	175	935
Granada	286	141	80	47	48	8	175	785
Jinotega	296	186	35	16	51	7	149	740
Leon	691	382	162	79	118	42	421	1,895
Managua	3,047	1058	461	403	271	56	1,550	6,846
Masaya	282	149	83	44	70	16	138	782
Matagalpa	474	300	62	34	86	20	276	1,252
Nueva Segovia	249	191	21	24	36	7	107	635
RAAN	360	276	82	4	28	4	156	910
RAAS	282	148	31	5	22	1	112	601
Rio San Juan	130	118	34	0	14	5	62	363
Rivas	312	166	105	21	46	9	168	827
Total	8,421	4,323	1,539	907	1,138	243	4,342	20,913

Source: Human Resources, MINSA Central 2006.

FIGURE A-3: **Basic Health Infrastructure**

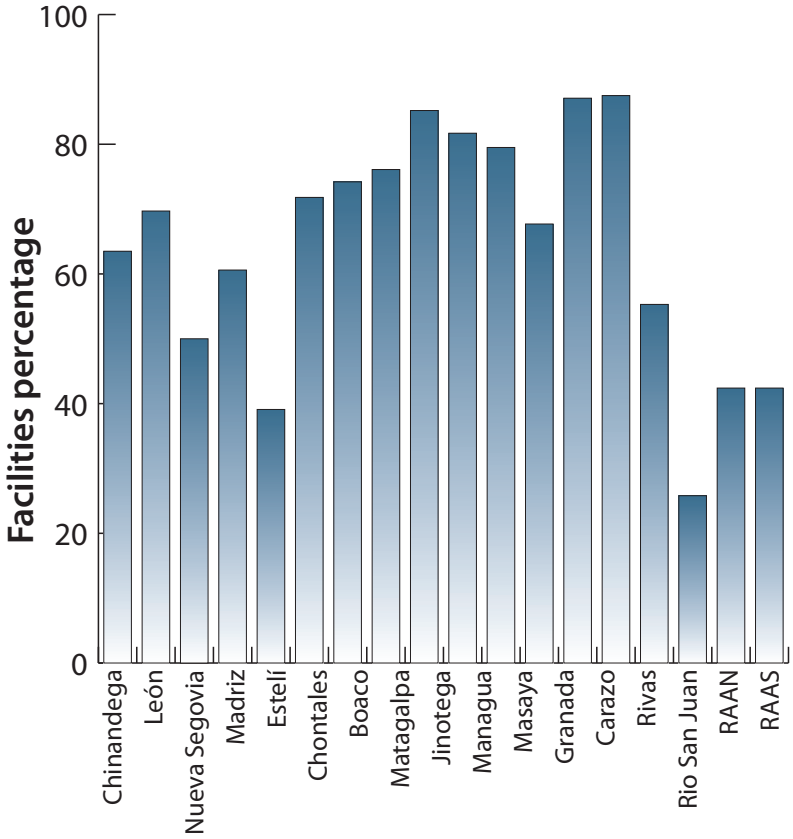


FIGURE A-4: **Infrastructure—Water supply**

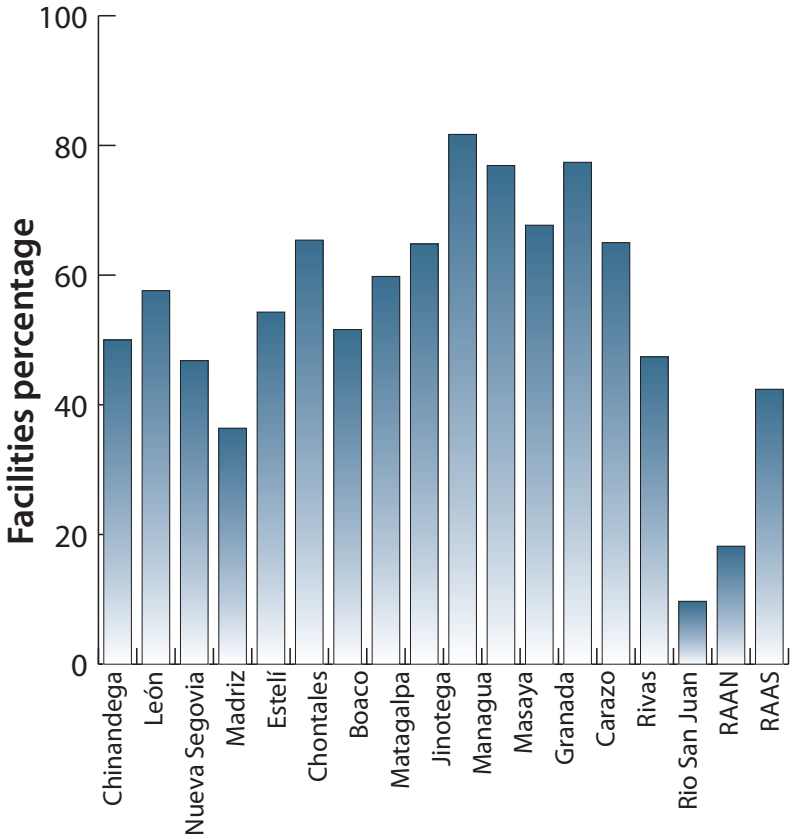


FIGURE A-5: **Infrastructure—Waste disposal**

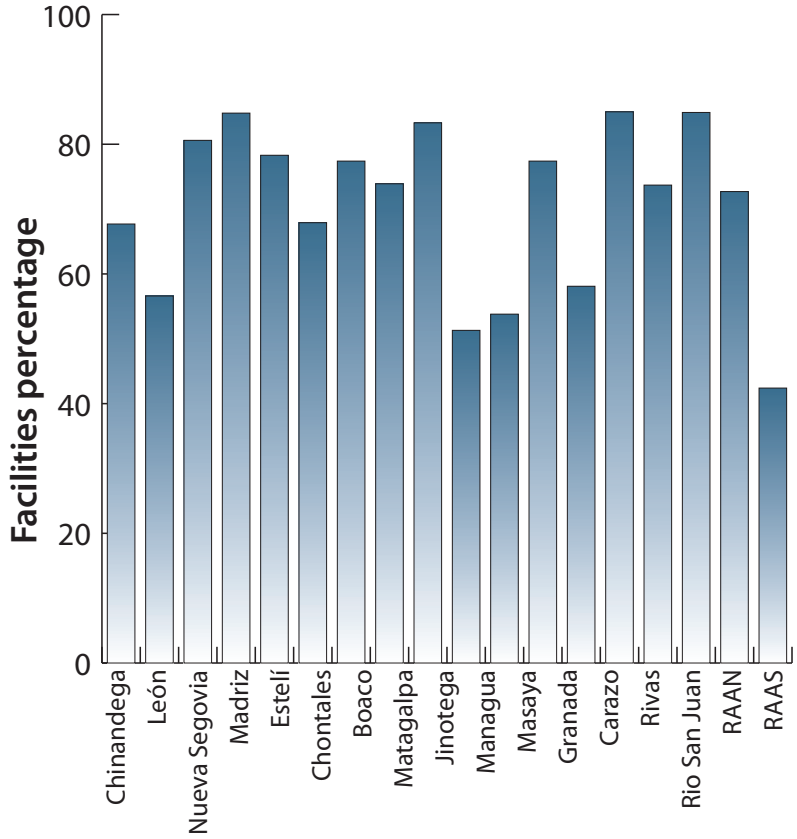


FIGURE A-6: **Infrastructure—Equipment and materials sterilizer**

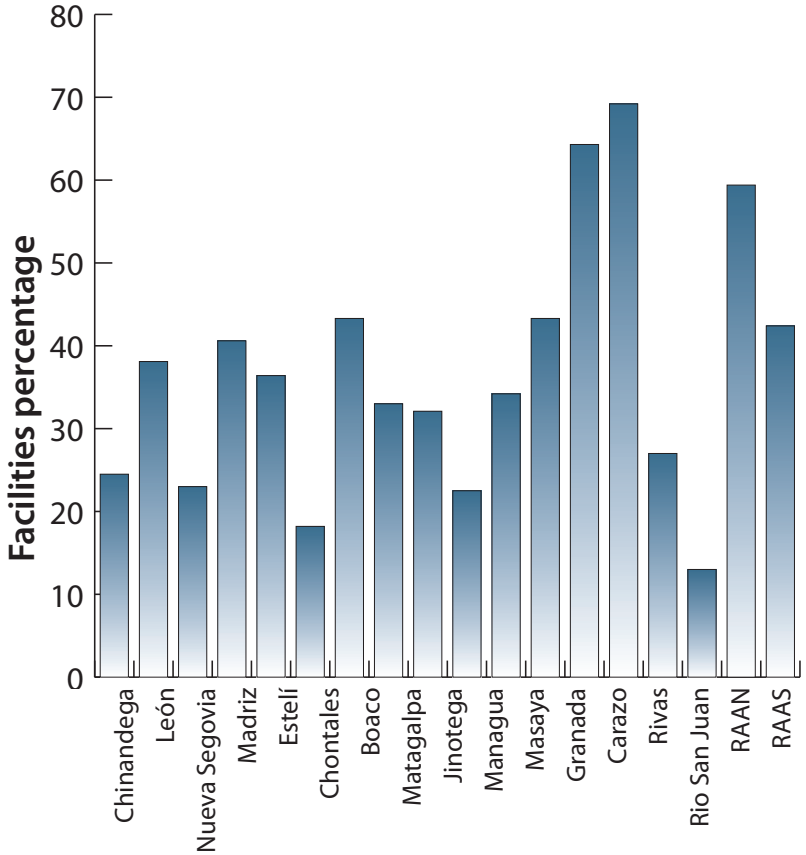


FIGURE A-7 : **Infrastructure—Sanitation service**

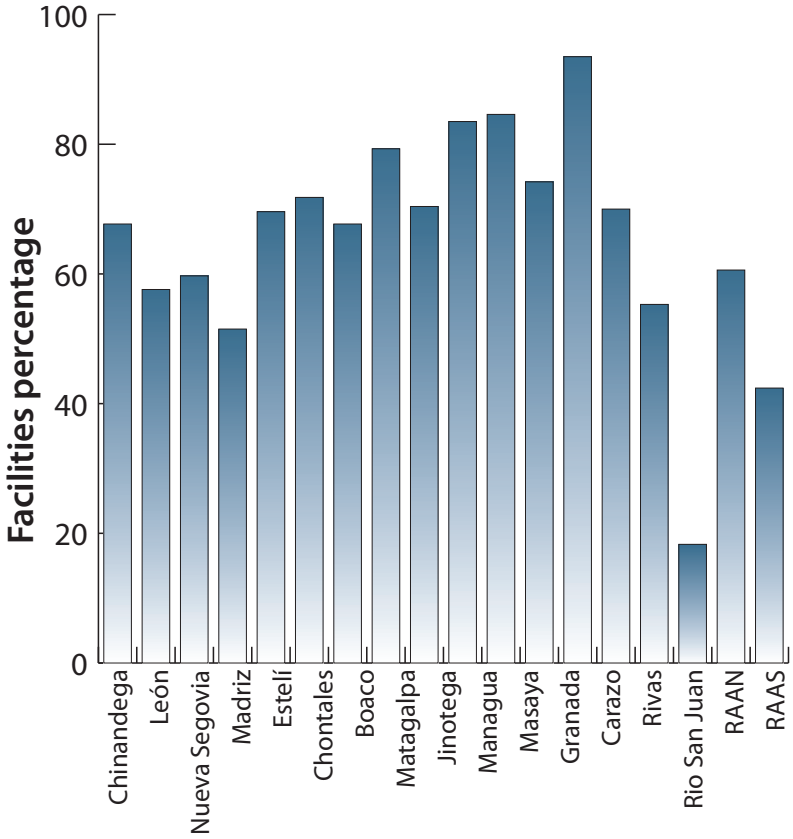


FIGURE A-8: **Infrastructure—Clinical laboratories**

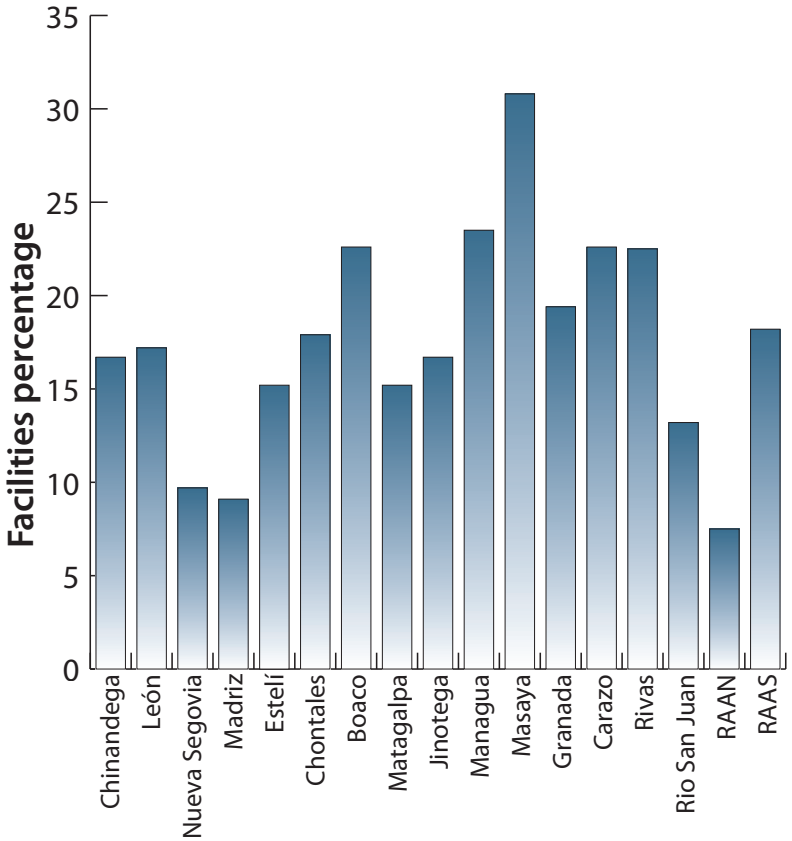


FIGURE A-9: **Infrastructure—STD diagnostics tests**

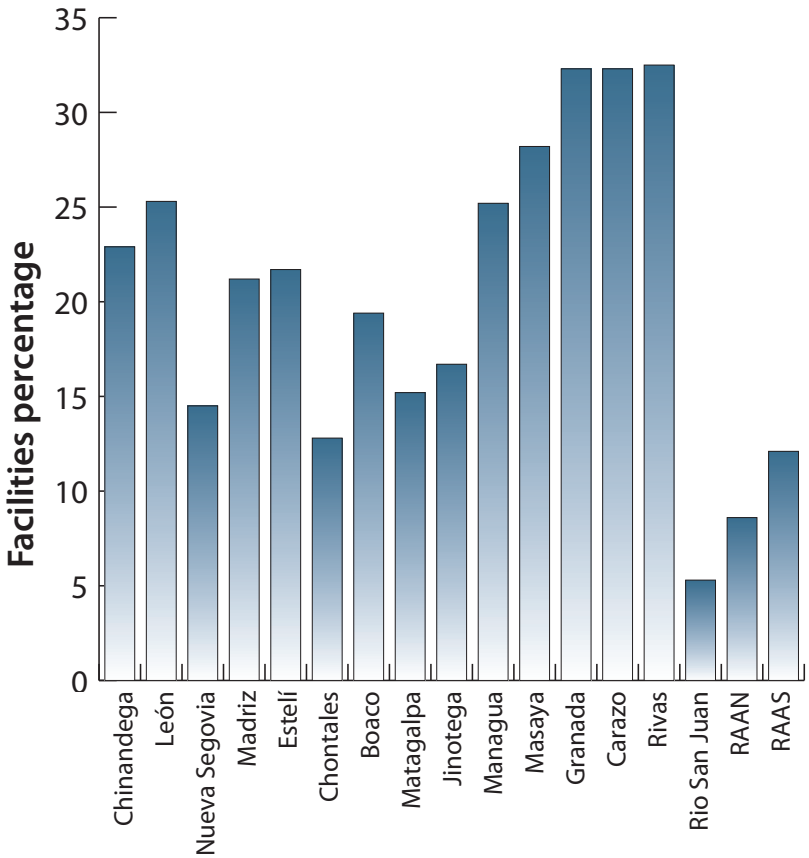


TABLE A-7: **Staffing of regional laboratories**

Area	Granada : 24			Matagalpa: 12		
	BA grads	Technicians	Administratives	BA grads	Technicians	Administratives
Management	1		9	1		4
Tuberculosis	1	2			1	
Bacteriology	1	1		1		
Virology				1		
Health microbiology	1				1	
Blood chemistry	2				1	
Hematology	1	4		1	1	
Total	7	8	9	4	4	4

TABLE A-8: **Monthly productivity of regional laboratories**

Area	Granada	Matagalpa
Virology	140	259
Bacteriology	520	773
Parasitology	422	723
Blood chemistry	2,541	609
Hematology/serol/uro	3,127	199
Health Microbiology.	438	230
Total	7,188	2,793
No. analysis by lab technicians per month	479 (2.9/hr)	349 (2.1/hr)

TABLE A-9: **Staffing of departmental laboratories**

Area	Jinotega: 5			Chontales: 9			León: 7			Madriz: 3			Nueva Segovia: 6		
	BA grad	Tech	Adm	BA grad	Tech	Adm	BA grad	Tech	Adm	BA grad	Tech	Adm	BA grad	Tech	Adm
Management			2	1		2	1		1			1			1
Virology					1			1							
Bacteriology	1						1						1		
Health microbiology		1								1				1	
Parasitology					1		1								
Health chemistry							1	1		1			1		
Hematology					2									1	
Tuberculosis					1									1	
Quality control	1				1										
Total	2	1	2	1	6	2	4	2	1	2		1	2	3	1

TABLE A-10: **Productivity of selected departmental laboratories**

Área	Jinotega	Chontales	León
Virology	30		296
Hematology	120	2,810	
Serology	214	415	264
Tuberculosis	100	104	
Urology	206	872	
Bacteriology	150		350
Parasitology	180	37	
Health chemistry	322		
Health microbiology	50		36
Quality control	111	126	730
Total	1,737	4,364	1,676
No. analysis by lab technicians per months	347 (2.1/hr)	484 (3.0/hr)	279 (1.7/hr)

TABLE A-11: **Staffing of selected hospital-based laboratories**

Level	RAAN	RAAS	Rivas	Chinandega	Carazo
BA Graduates	1	3	2	8	6
Technicians	4	3	10	5	8
Nurse's Aides		9	3	1	3
Administratives		5			4
Total	5	21	15	14	21

TABLE A-12: **Monthly productivity of selected hospital-based laboratories**

Area	RAAS	Chinandega	Rivas	Carazo
Hematology	6,946	5,433	5,755	5,000
Bacteriology	279			
Serology	1,553	535	424	6,730
Blood chemistry	2,540	6,626	4593	11,000
Uroanalysis/copro/b	1,866	976	1841	8,600
Total	13,184	13,628	12,613	31,330
No. analysis by lab technicians per months	878 (2.4/hr)	908 (3.7/hr)	900 (3.7/hr)	1,842 (5.1/hr)

TABLE A-13: **Diseases and Conditions with Compulsory notification**

Cholera
Measles
Whooping cough
Tetanus
Poliomielitis
Diphtheria
Rabies
Animal bites with suspicion of rabies
Viral meningitis
Bacterial meningitis
Meningococcal meningitis
Tuberculosis
HIV
Hepatitis a
Hepatitis b
Leptospirosis
Dengue
Malaria
Chagas
Visceral leishmaniasis
Cutaneous leishmaniasis
Muco-cutaneous leishmaniasis
Pesticide poisoning
Poisoning (other substances)
Food poisoning
Gonorrhea
Syphilis
Anthrax
Brucellosis
Yellow fever
Plague
oft chancroid
Cysticercosis
Genital/venereal warts
Epidemic conjunctivitis
Scabies
Mercury poisoning
Lead poisoning
Leprosy
Lymphogranuloma venereum
Parotiditis
Pediculosis
Treponema pertenue
Treponema pallidum carateum (pinta)
Shigellosis
Silicosis
Toxoplasmosis
Chickenpox

TABLE A-14: Diseases and Conditions with Compulsory notification

Cases and deaths by:

Diarrhea
Cholera
Acute respiratory infections
Pneumonia
Measles
Whooping cough
Tetanus
Poliomielitis
Diphtheria
Rabies
Animal bites with suspicion of rabies
Viral meningitis
Bacterial meningitis
Meningococcal meningitis
Tuberculosis
HIV
Hepatitis a
Hepatitis b
Leptospirosis
Dengue
Malaria
Disease of chagas
Visceral leishmaniasis
Cutaneous leishmaniasis
Muco-cutaneous leishmaniasis
Snake bites
Pesticide poisoning
Poisoning (other substances)
Intra-family sexual violence
Intra-family physical violence
Intra-family psychological violence
Suicide attempt
Maternal mortality
Neonatal mortality
Fetal deaths
Traffic injuries
Suicides by other methods
Intentional violence
Homicides
Greese sickness
Food poisoning

TABLE A-15: Health investment per component (Corbodas), 2002–2005

Component	2002	2003	2004	2005	Total	%
Design and infrastructure	27,694,185	203,171,472	230,021,962	193,767,563	654,655,183	30.7
Equipment	33,428,814	215,468,030	197,780,833	124,645,344	571,323,021	26.8
Drugs	220,230,441	34,409,174	89,070,648	129,150,523	472,860,786	22.2
Medical inputs	89,047,401	86,801,722	135,443,231	121,555,389	432,847,743	20.3
Total annual	370,400,841	539,850,390	652,316,675	569,118,819	2,131,686,733	100.0

Source: Management Report. MINSA 2002-2006.

TABLE A-16: Health investments by source of funding, 2002–2005

Source	Total 2002-2005	%
Treasury	276,732,310	13.0
External sources:	1,854,954,411	87.0
Donations	1,001,829,900	54.0
Loans	853,124,511	46.0
Total funding	2,131,686,721	100.0

Source: Management Report. MINSA 2002-2006.

TABLE A-17: **Nonprofit organizations in Nicaragua**

Agency/NGO	Component	Scope
Pan American Health Organization	Comprehensive technical and financial assistance in health sector	Nationwide
UNICEF	Infant health, nutrition, breastfeeding, immunizations, WSS, comprehensive and community health	Nationwide
World Bank	Institutional strengthening and capacity building funding component	Nationwide
Global Fund	Malaria, Tuberculosis, HIV/AIDS component	Nationwide
United Nations Population Fund (UNFPA)	SRH	Nationwide
JICA	Staff training, research and strengthening Chagas' Disease Program	Nationwide
Bi-national assistance Venezuela	Support Antiretroviral Therapy (ART), Ophthalmologic health care, Specialized health care	Nationwide
Bi-national assistance Argentina	Support Antiretroviral Therapy (ART)	Nationwide
Bi-national assistance Cuba	Healthcare staff, Staff training, Technical assistance	Nationwide
Bi-national assistance Spain	Support Antiretroviral Therapy (ART), Staff training	Nationwide
Bi-national assistance Italy	Support Antiretroviral Therapy (ART), Staff training	Nationwide
Bi-national assistance Brazil	Support Antiretroviral Therapy (ART), Staff training	Nationwide
Bi-national assistance Taiwan	Health Promotion, Chagas' Disease Control Program	Nationwide
AECI	Epidemiological Surveillance, Sexual y Reproductive Health Project (SRH)	Nationwide and Projects in RAAN-Jinotega
AID	Institutional strengthening and capacity building financial support, Profamilia, Sexual and Reproductive Health (SRH), Sanitation Infrastructure, Environmental Health	Nationwide
PATH	Women's health, adolescence, violence, prevention and cervical cancer prevention and handling, diagnostic Technologies, inmunizations and nutricion. Executing Entre amigas, Intercambio projects, Program of Technologic Advance of rapid-test of cervical cancer screening in Masaya, Diagnostic Project of Global Health	National
Médicos sin Fronteras	Chagas' Disease Project in Matagalpa and Madriz	Matagalpa, Madriz
Médicos del Mundo Spain	Community Health, Leishmaniasis Project	Rio San Juan
CARE	WSS, Community Health, Influenza	Nationwide
US Centers for Disease Control and Prevention (CDC) Atlanta	Technical Assistance on infectious diseases	Nationwide
Save Children	Infant Health, Community Health, nutrition, WSS	8 Departments
Damien Foundation	Support Leishmaniasis and Tuberculosis Program	Nationwide
Acción Médica Cristiana	Community Health, Health Promotion	RAAN
Wisconsin Nicaragua	Community Health	Jinotega

Agency/NGO	Component	Scope
ALISTAR	Community Health, Water Supply & Sanitation (WSS)	Bosawas and Ometepe Island
Adventist Development Relief Agency ADRA	PHC, Environmental and Community Health, Disaster Relief	Nationwide
Project Concern International	Community Health, Water Supply & Sanitation (WSS) , Nutrition, Comprehensive Women's Care	Jinotega
Catholics Relief Services (CRS)	Health Promotion, STI/HIV-AIDS, Community Health	Estelí, Matagalpa, Jinotega, Madriz, Nueva Segovia, León/ Chinandega, Río San Juan and Atlantic Coast
Centro de Estudios y Protección Social (CEPS)	Health Promotion, Sexual and Reproductive Health (SRH), Violence, STI/HIV-AIDS	Jinotega, León Madriz, Nueva Segovia, Estelí, Managua and Matagalpa.
PROFAMILIA	Healthcare services, Comprehensive Women's Care, Violence and STI/AIDS, Comprehensive Healthcare Services	Managua, Matagalpa, Jinotega, Boaco, Chontales, Estelí, Madriz, Nueva Segovia, Masaya, Rivas and Chinandega
HOPE Project	Community Health, Sexual and Reproductive Health (SRH), Infant Health	Jinotega and Chontales
University of California	Dengue Fever Diagnosis in Managua Project	Managua
MERCK	Donation of Rotavirus vaccines and Research	Nationwide
ICAS	Sexual and Reproductive Health (SRH), Cancer, HIV/AIDS	5 Departments
CEPRESI	Health Promotion, STI/HIV-AIDS	
ANASAN	Water Supply & Sanitation (WSS), Friendly Schools	3 Departments
Foundation for the Development of Children and Women "Blanca Aráuz". FUNDEMUNI	Sexual and Reproductive Health (SRH), Maternal and Infant Health, Water Supply & Sanitation (WSS) , Violence and Mental Health	Nueva Segovia
Arco iris Foundation	Healthy Lifestyles and Habits	3 Departments
Puntos de Encuentro	Health Promotion, Violence, STI/HIV-AIDS	Nationwide
Pro Mujer	Health Promotion, Sexual and Reproductive Health (SRH), Violence, STI/HIV-AIDS	León, Chinandega, Masaya, Managua
World Vision Plan	Disaster Prevention, Community Health	7 Departments
Horizon 3000	Comprehensive and Community Health	
Xochiquetzal Foundation	Comprehensive Women's Care, Violence and STI/ AIDS	
IXCHEN Women's Center	Comprehensive Women's Care, Violence and STI/ AIDS	Nationwide
Civil Voluntary Group	Health Promotion, STI/HIV-AIDS	
Nimehuatzin Foundation	Health Promotion, STI/HIV-AIDS	
SI MUJER Foundation	Sexual and Reproductive Health (SRH), Violence, STI/AIDS	
Action Against Hunger	Food Security and Natural Disaster Relief	Nationwide, Project in Madriz
Asociación para el desarrollo de los pueblos ADP	Community Health, Gender Approach, Water Supply & Sanitation (WSS)	4 Departments y RAAN-RAAS

Agency/NGO	Component	Scope
Centre for AIDS Education and Prevention (CEPRESI)	HIV/AIDS	8 Departments
Foster Parents Plan International - Nicaragua	Healthcare for Children under Special Circumstances	6 Departments
Human Promotion Institute – Somoto. INPRHU-Somoto	Prevention Health	Madriz Nueva Segovia, Estelí, Bluefields Managua León, Masaya, Granada, Carazo and Southern Autonomous Atlantic Region
Pan American Social Marketing Organization (PASMO)	HIV/AIDS	León, Chinandega, Managua, RAAS and RAAN
Vaccination and Communal Development Project of Nicaragua (PROVADENIC)	Healthy Communities	7 Departments and RAAN
Workshop on Peasant Health (TASCA)	Strengthening of Laboratories, Surveillance of quality of rural water and scholarships for the health staff.	Jinotega, Matagalpa, Madriz, Nueva Segovia, León, Nacional Diagnose Center and Reference.
Telemedicina Project DESOS SOLIDARIA	Telemedicine joint with La Aurora Health Center (Kukra River), Bluefields Hospital , RAAS SILAIS and C/S Bluefields, a Hospital in Managua and a Hospital in Spain will be working soon	RAAS
Modernization Health Sector Project. World Bank.	The main objectives were addressed to the institutional capacity and management systems' improvement of the Ministry of Health; improving the services quality through the implementation of a new model of health primary attendance and the strengthening of the institutional capacity of the Nicaraguan Institute of Social Security, accompanied by the reforms of their of its provisional health systems and labor risks. Components: institutional strengthening of the Ministry of Health; Health Primary Attendance; Improvement of the Medical Supplying system; restoration and maintenance of Hospitals and Technical Assistance of the Nicaraguan Institute of social security(INSS by its acronym in Spanish)	National
Dengue Project		Managua (Sócrates Flores Health Center)

TABLE A-18: **Requirements of the Bluefields Hospital**

Needs	Specification
Specialist doctors	Pediatric surgeon 1 Anesthesiologtist1 Psychiatrist 1 Radiologist1 Urologist 1
General doctors	4
Nurses	12
Laboratory technicians	4
Others	Cleaners 12
Equipment	Phototherapy ECG Pulse Oximeters Oxygen concentrator Spirometer Cardiac monitor Peritoneal dialysis equipment
Laboratory reagents	Hepatic tests Seric electrolytes Proteins, fibrinogen Creatinine Herpes and Chlamydia tests Reagents for gasometry Thyroid tests Cardiac enzymes Rapid prostate tests Rapid hepatitis tests Hemocultures Toxoplasmosis tests Helicobacter pylori tests

TABLE A-19: **List of Basic Medicines**

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Bencilpenicilina G Cristalina. Polvo Liofilizado 1,000,000 UI.Fam.I.V.	Fam	1.78	
Bencilpenicilina G Procaínica. Polvo Liofilizado 800,000 UI.Fam.I.M. / I.V.	Fam	2.03	
Bencilpenicilina G Benzatínica. Polvo Liofilizado 1,200,000 UI. Fam. I.M.	Fam	3.42	
Dicloxacilina. Suspensión 125mg/5ml. Frasco de 100 - 120 ml.	Fco	10.04	
Cloxacilina Sódica. Polvo Liofilizado 500 mg. Fam. I.M. / I.V.	Fam	11.34	
Dicloxacilina. Cápsula 500mg.	Cap	1.17	
Amoxicilina. Suspensión Oral 250mg/5ml. Frasco 100 - 120 ml.	Fco	7.01	
Amoxicilina. Cápsula o Tableta Oral 500mg.	Cap / Tab	0.44	
Ampicilina. Polvo Liofilizado 1g. Fam. I.V.	Fam	3.86	
Cefazolina. Polvo Liofilizado 1g. Fam. I.V.	Fam	10.47	
Cefalexina Cápsula o TabletaOral 500 mg	Cap/Tab	0.85	
Cefotaxima. Polvo Liofilizado 1 g. Fam. I.M / .I.V.	Fam	12.28	
Ceftazidima pentahidrato . Polvo Liofilizado 1 g. Fam. I.M / .I.V.	Fam	17.64	
Ceftriaxona. Polvo Liofilizado 1 g.Fam. I.M / .I.V.	Fam	7.93	
Eritromicina Etilsuccinato. Suspensión 250mg/5ml. Frasco 100 ml.	Fco	19.74	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Eritromicina Estearato. Tableta ranurada 500 mg.	Tab	1.07	
Clindamicina. Cápsula 300mg.	Cap	3.8	
Clindamicina Fosfato. Solución Inyectable 150mg/1ml. En ampolla 6ml I.M. / I.V.	Fam	22.64	
Azitromicina dihidrato Cápsula o Tableta oral 500 mg	Tab	2.66	
Doxiciclina Hiclato. Cápsula 100 mg.	Cap	0.33	
Cloranfenicol Palmitato. Suspensión Oral 125mg/5ml. Frasco 60 - 110 ml.	Fco	48	
Cloranfenicol. Cápsula 500 mg.	Cap	6.52	
Cloranfenicol Succinato Sódico. Polvo Liofilizado 1 g. Fam.I.M. / I.V.	Fam	7.95	
Gentamicina Sulfato. Solución Inyectable 10mg/ 1ml. Amp. 2ml. I.M. / I.V.	Amp	1.26	
Gentamicina Sulfato. Solución Inyectable 40mg/ 1ml. Amp.2ml. I.M. / I.V.	Amp	1.35	
Amikacina Sulfato. Solucion Inyectable 50 mg/1ml. Amp 2ml. I.M / I.V.	Amp	2.52	
Amikacina. Solución Inyectable 250mg/1ml. Amp. 2 ml. I.M. / I.V.	Amp	3.8	
Trimetoprim + Sulfametoxazol 40 mg+200 mg./ 5 ml. suspensión oral frasco. 100 ml.	Fco	5.31	
Timetoprim + Sulfametoxazol Tableta Oral 160 x 800 mg	Tab	9.85	
Sulfadiacina de Plata. Crema Tópica 1%. Frasco 250 g.	Fco	37.5	
Sulfadiacina de Plata Crema Tópica 1% en tubo de 15 a 25 g	Tbo	17.5	
Nitrofurantoína Suspensión Oral 25mg/ 5ml. Frasco 100 - 120 ml.	Fco	31	
Nitrofurantoina. Tableta Oral 100mg.	Tab	1.48	
Furazolidona. Suspension Oral 50mg/5ml. Frasco de 100 - 120 ml.	Fco	20	
Furazolidona. Tableta Oral de 100 mg.	Tab	2.2	
Nistatina. Suspensión 100,000 UI/ ml. Frasco 30 ml.	Fco	9.6	
Fluconazol Tableta o Capsula Oral 150mg	Tab/Cap	0.64	
Cloroquina Fosfato. Tableta Oral250 mg.	Tab	0.32	
Primaquina Fosfato. Tableta Oral 5mg Base.	Tab	0.25	
Primaquina Fosfato Tableta Oral 15 mg Base.	Tab	0.36	
Antimoniato de Meglumina. Solución Inyectable 1.5g / 5ml. Amp. 5 ml. I.M.	Amp	29.85	
Ciprofloxacina. Tableta Oral Recubierta 500 mg.	Tab	0.44	
Ranitidina. Solución Inyectable 25mg/ 1ml. Amp 2 ml. I.V.	Amp	1.7	
Ranitidina Tableta oral 300 mg	Tab	1.01	
Omeprazol 40 mg Polvo Liofilizado I.V.	Fam	32.62	
Omeprazol Cápsula Oral 20 mg	Cap	0.5	
Enema fosfato y bifosfato sódico. Solución rectal 6 g - 16 g en frasco de 100 - 150ml.	Fco	18	
Dimenhidrinato. Tableta Oral 50 mg.	Tab	0.16	
Dimenhidrinato. Solución Inyectable 50mg/ml. Amp. 1 ml. I.M.	Amp	2.34	
Metoclopramida. Solución Inyectable 10mg/ 1ml Amp. 2 ml. I.M.	Amp	1.45	
Tinidazol. Tableta Oral 500 mg.	Tab	0.27	
Metronidazol. Suspensión Oral 125mg/ 5ml. Frasco 120 ml.	Fco	8.33	
Metronidazol. Solución Inyectable 5 mg/1 ml en frasco o bolsa de 100 ml. I.V.	Fam o Bls	13.79	
Metronidazol Tableta oral 500 mg	Tab	0.72	
Albendazol Suspensión oral 400 mg en frasco de 10 a 20 ml	Fco	2.89	
Albendazol Tableta oral ranurada 400 mg	Tab	2.23	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Mebendazol. Tableta Oral 100 mg.	Tab	0.14	
Mebendazol. Tableta Oral 500 mg.	Tab	1.2	
Salbutamol Sulfato (Albuterol). Solución oral 2mg/ 5ml. Frasco 100 ml.	Fco	2.33	
Salbutamol Sulfato Aerosol Inhalado. Aerosol 0.1% (100 mcg / Aspersión). Envase Aspersor 200-250 dosis.	Fco	22.64	
Salbutamol Sulfato Albuterol Inhalado. Solución p/Nebulizador 5mg/ ml. 0.5 %. Frasco 20 ml.	Fco	4.51	
Aminofilina. Solución 25mg/ 1ml. Amp. 10 ml. I.V.	Amp	12.36	
Beclometazona. Aerosol Solución para aspersión 50 mcg/inhalación medida en frasco de 200 dosis.	Fco	57.96	
Digoxina. Solución Inyectable 0,25mg/ml. Amp 2 ml. I.V.	Amp	15.94	
Digoxina. Tableta Oral 0,25 mg.	Tab	0.27	
Carvedilol Oral Tableta Ranurada 6.25 mg.	Tab	4.5	
Amiodarona. Tableta Oral 200 mg.	Tab	0.78	
Verapamilo. Clorhidrato. Solución Inyectable 2.5mg/1ml. Amp. 2 ml. I.V.	Amp	15.15	
Verapamilo. Tableta Oral 80 mg.	Tab	0.38	
Dopamina Clorhidrato. Solución Acuosa 40mg/ 1ml. Amp. 5 ml.I.V.	Amp	14.65	
Epinefrina Acuosa 1:1000 (Adrenalina). Solución Inyectable 1% (1:1000) Amp. 1 ml. I.V. / S.C.	Amp	1.75	
Epinefrina Acuosa 1:10,000 (adrenalina) Inyección 100 mcg/1 ml en ampolla de 10 ml. I.V. / S.C.	Amp	3.67	
Dinitrato de Isosorbide. Tableta Sublingual 5 mg.	Tab	0.45	
Dinitrato de Isosorbide. Tableta Oral 10 mg.	Tab	0.21	
Acido Acetilsalicílico. Tableta Oral 100 mg.	Tab	0.17	
Atenolol. Tableta Oral Ranurada 100 mg.	Tab	0.23	
Enalapril Maleato. Tableta Oral Ranurada 10 mg.	Tab	0.08	
Captopril. Tableta Oral 25 mg.	Tab	0.09	
Enalapril Maleato Tableta Oral Ranurada 20mg	Tab	0.25	
Metildopa. Tableta Oral Ranurada 500 mg.	Tab	1.74	
Hidralacina Tableta o Gragea Oral 50 mg.	Tab/Grg	1.09	
Hidralacina Clorhidrato. Solución Inyectable 20mg/ ml. Amp. 2 ml. I.M. / I.V.	Amp	31.98	
Nifedipina Tableta oral del liberación sostenida 10 mg	Tab	2.38	
Nifedipina Tableta oral del liberación sostenida 20 mg	Tab	3.81	
Acido fólico Tableta oral 5 mg	Tab	0.9	
Sulfato Ferroso+Acido Fólico. Tableta Oral 60mg+400mcg.	Tab	0.32	
Sulfato Ferroso, Hierro Elemental. Solución Oral 15mg/ 0,6ml. Frasco 30 ml.	Fco	3.68	
Heparina Sódica. Solución Inyectable 5000 UI/ml. Frasco 10 ml. I.V. / S.C.	Fam	29.33	
Fitomenadiona (vitamina K1). Solución Inyectable 1mg/ 0.5ml. Amp. 0.5 - 1 ml. I.M. / I.V.	Amp	1.59	
Fitomenadiona (vitamina K1). Solución Inyectable 10mg/ 1ml. Amp. 1 ml. I.M. / I.V.	Amp	4.53	
Glucosa en Agua. Solución Inyectable 5%.Frasco 1000 ml. I.V.	Fco / Bls	15.4	
Glucosa en Agua. Solución Inyectable 10%. Frasco 500 ml. I.V.	Fco / Bls	11.59	
Glucosa en Agua. Solución Inyectable 5%. Frasco 500 ml. I.V.	Fco / Bls	11.23	
Glucosa en Agua. Solución Inyectable 50%. Fam. 50 ml. I.V.	Fam	8.51	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Hartman Solución (NaCl+ClK+C12Ca+NaHCO3) Inyección NaCl 0.6 mg + KCl 0.03 mg + CaCl2 0.02 mg + NaHCO3 0.31 mg en frasco/bolsa de 1000 ml. I.V.	Fco / Bls	14.31	
Cloruro Sódico (Sol. Fisiológica). Solución Inyectable 0.9%. (Solución Salina Normal) en frasco/bolsa de 1000 ml. I.V.	Fco / Bls	17.57	1
Cloruro de Sodio Inyección 0.9% (Solución Salina Normal) en frasco/bolsa de 500 ml. I.V.	Fco / Bls	13.4	
Agua Destilada. Solución Inyectable. Amp. 10 ml. I.M. / I.V.	Amp	1.09	
Cloruro de Potasio. Solución Inyectable 2 mmol ó mEq/1 ml en ampolla de 1.5 gr/10 ml. I.V.	Amp	2.8	
Cloruro Sódico (solución hipertónica) 20 % (3.42 mEq/1 ml) . Solución Inyectable 2mEq/ ml. Amp. 10 ml. I.V.	Amp	3.26	
Bicarbonato Sódico. Solución Inyectable 7.5 % (1 mEq/1 ml). Amp. 10 ml.I.V.	Amp	3.8	
Solución Electrolitos Orales : Glucosa 20 g, Cloruro Sódico 3.5 g, Cloruro de Potasio1.5 g, Citrato Trisódico Dihidratado 2.9 g/ Litro. Suspension 30g.	Sbe	1.54	
Solución Electrolitos Orales de Osmolaridad Reducida (245 mOsmol/l): Glucosa anhidra 13.5 g/L (75 mmol/L), Cloruro de Sodio 2.6 g/L (45 mmol/L), Cloruro de Potasio 1.5 g/L (20 mmol/L), Citrato trisodico dihidratado 2.9 g/L (11.24 mmol/L). En sobres para	Sbe	1.54	
Calcio carbonato Tableta oral 1.5 g (600 mg de Ca)	Tab	0.97	
Furosemida. Tableta Oral 40 mg.	Tab	0.08	
Furosemida. Solución Inyectable 10mg/ 1ml. Amp. 2 ml. I.M. / I.V.	Amp	1.82	
Hidroclorotiacida. Tableta Oral Ranurada 50 mg.	Tab	0.16	
Hidroclorotiacida + Amiloride. Tableta Oral Ranurada 50mg/5mg.	Tab	0.44	
Manitol. Solución Inyectable 20%.Frasco 250 ml. I.V.	Fco	22.46	
Valproato Sódico. Solución Oral 250mg/ 5 ml. Frasco de 100 - 120ml.	Fco	44.89	
Carbamacepina. Tableta Oral Ranurada 200 mg.	Tab	0.23	
Acido Valproico Tableta oral o Capsulas 250 mg.	Tab/Cap	2.15	
Clonazepam. Tableta Oral 2 mg.	Tab	1.21	
Fenitoína (Difenilhidantoína Sódica). Suspensión Oral 125mg/5ml. Frasco 120 ml.	Fco	32.61	
Fenitoína (Difenilhidantoína). Cápsula 100 mg	Cap	0.26	
Fenobarbital Solución oral 15 mg/5 ml en frasco de 100 ml	Fco	38.56	
Sulfato de Magnesio. Solución Inyectable 10% (0.1 gr/1 ml) 1g. Amp. 10ml. I.V.	Amp	2.71	
Sulfato de Magnesio Inyección 50% (0.5 gr/1 ml) en ampolla de 10 ml. I.V.	Amp	10.5	
Diazepam. Solución Inyectable 5mg/1ml. Amp. 2ml. I.M. / I.V.	Amp	1.44	
Fenitoína (Difenilhidantoína Sódica). Solución Inyectable 50mg/1ml. Vial de 5 ml. I.V.	Fam	8.88	
Fenobarbital Sódico. Solución Inyectable 200mg/ ml. Amp. 1 ml. I.V.	Amp	11.28	
Trihexifenidilo. Tableta Oral 5 mg.	Tab	0.65	
Neostigmina Metilsulfato. Solución Inyectable 0,5mg/ml Amp. 1 ml. I.M / I.V.	Amp	3	
Propranolol Tableta oral 40 mg	Tab	0.09	
Alprazolam 1 mg Tableta Oral	Tab	1.5	
Diazepam. Tableta Oral 5 mg.	Tab	0.11	
Lorazepam. Tableta Oral 2 mg.	Tab	0.2	
Clorpromazina Clorhidrato. Tableta Oral 100 mg.	Tab	0.45	
Clorpromazina Clorhidrato. Solución Inyectable 25mg/ ml. Amp. 5 ml. I.V.	Amp	3.49	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Tioridazina. Tableta Oral 100 mg.	Tab	1.47	
Fluofenazina Decanoato. Solución Inyectable 25mg/ ml. Amp. 1 ml. I.M.	Amp	34.31	
Haloperidol. Solución Oral 2mg/ ml. Frasco 15 - 30 ml.	Fco	1.6	
Haloperidol. Solución Inyectable 5mg/ml. Amp.1 ml. I.M. / I.V.	Amp	3.08	
Haloperidol. Tableta Oral 5 mg.	Tab	1.2	
Amitriptilina. Tableta Oral 25 mg.	Tab	0.22	
Amitriptilina. Tableta Oral 75 mg.	Tab	0.76	
Clomipramina clorhidrato Tableta oral 25 mg	Tab	7.77	
Imipramina clorhidrato Tableta oral 10 mg	Tab	0.8	
Imipramina Clorhidrato. Tableta Oral 25 mg.	Tab	0.14	
Oxitocina Sintética. Solución Inyectable 5UI/ ml. Amp. 1 ml. I.M. / I.V.	Amp	1.47	
Ergometrina (ergobasina). Solución Inyectable 0,2mg/ ml. (200 mcg/1 ml) Amp.1 ml. IM. / I.V.	Amp	1.76	
Clotrimazol. Ovulo o Tableta vaginal 100 mg.	Ovu	1.18	
Ritodrina hidrocloruro Inyección 10 mg/1 ml en ampolla de 5 ml. I.V.	Amp	28.5	
Fenoterol Hidrobromuro. Solución Inyectable 0.5mg/10ml. Amp. 10 ml.I.V.	Amp	18.11	
Fenoterol Hidrobromuro. Tableta Oral 5 mg.	Tab	5.09	
Inmunoglobulina anti-D RHD. Solución Inyectable 250 mcg/ 2ml. Fam. de 2ml. I.M.	Fam	683	
Ciprofloxacina clorhidrato Solución ótica 0.2% en frasco gotero de 10 ml	Fco	26.3	
Tetraciclina Clorhidrato. Ungüento Oftálmico 1 %.Tubo 5 g.	Tbo	9.05	
Clotrimazol. Crema Topica 1%. Tubo 20 - 30 g.	Tbo	3.88	
Ketoconazol. Crema Topica 2 %. Tubo de 20 - 30 g.	Tbo	7.25	
Benzoato de Benzilo Loción Topica 25% frasco 100 - 120 ml	Fco	11.21	
Clostebol 500mg + Neomicina 533mg / 100mg Crema Topica Tubo 10grm	Tbo	14.21	
Hidrocortisona Butirato. Crema Topica 1%. Tubo 15 g.	Tbo	9.64	
Ketotifeno fumarato hidrogenado Solución oral 1 mg/5 ml en frasco de 100 - 120 ml	Fco	10.05	
Ketotifeno fumarato hidrogenado Tableta oral 1 mg	Tab	0.17	
Difenhidramina Solución Oral 12.5mg/5mml frasco 100 - 120 ml	Fco	15.81	
Difenhidramina. Solución Inyectable 10mg/ 1ml. Amp.5 ml. I.M. / I.V.	Amp	5	
Loratadina Solución Oral 5mg/5ml frasco 100 - 120 ml	Fco	7	
Loratadina Tableta Oral 10mg	Tab	0.35	
Oxido de zinc pasta 20 %. Frasco 30 g.	Fco	5.43	
Vitamina C Tableta oral 500 mg	Tab	0.51	
Retinol (Vitamina A). Solución Oral 25,000 UI/ gota Frasco 30 ml.	Fco	88.2	
Retinol (Vitamina A) Cápsula/Perla Oral 100,000 UI	Cap/Per	0.98	
Multivitaminas Adulto con (Tiamina, Piroxina,Riboflavina,Cianocobalamina. Tocoferol,Retinol)	Grg	0.26	
Zinc gluconato Tableta oral 50 mg	Tab	1.43	
Vitamina A, C y D sin fluor. Solución oral 5.000 UI + 150 mg + 2,000 UI/1 ml frasco 30 ml	Fco	75.88	
Morfina Sulfato. Solución Inyectable 20mg/1 ml. Amp.1 - 2 ml.I.M. / I.V.	Amp	11.26	
Paracetamol (Acetaminofen). Solución oral 100 mg/1 ml en frasco gotero de 15 - 30 ml, libre de alcohol.	Fco	3.9	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Paracetamol (Acetaminofen) Solución oral 120 mg/5 ml en frasco de 100 ml - 120 ml, libre de alcohol	Fco	9.32	
Paracetamol (Acetaminofen). Tableta Oral 500 mg	Tab	0.09	
Paracetamol (Acetaminofen). Supositorio Rectal 300 mg.	Sup	1.31	
Indometacina. Tableta Oral 25 mg.	Tab	0.11	
Ibuprofeno. Tableta Oral 400 mg.	Tab	0.11	
Diclofenac Sódico. Solución Inyectable 75mg/3ml. Amp. 3 ml. I.M.	Amp	1.06	
Ketorolaco Trometamina. Solución Inyectable 30 mg/ml. Amp.1 ml. I.M / I.V.	Amp	5.4	
Ketorolaco Trometamina Tableta Oral 10 mg	Tab	1.62	
Dexametazona Fosfato Sódico. Solución Inyectable 4mg/ 1ml.Fam. 2 ml. I.M. / I.V.	Fam	1.78	
Hidrocortisona Succinato Sódico. Polvo Liofilizado 500mg. Fam. I.V.	Fam	28.98	
Betametasona Fosfato Sódico Inyección 4 mg/1 ml en ampolla de 1 - 2 ml. I.M.	Amp	65.84	
Prednisona. Tableta Oral 5 mg.	Tab	0.16	
Prednisona. Tableta Oral Ranurada 50 mg.	Tab	0.98	
Prednisona Solución oral 5 mg/5 ml en frasco de 60 ml	Fco	62.83	
Dexametasona Tableta oral 0.5 mg (500 mcg)	Tab	0.47	
Insulina Humana NPH (Isofana Humana Biosintetica Recombinante). Solución Inyectable 100 UI/ ml. Fam.10 ml. S.C.	Fam	79.7	
Insulina Humana Rápida (Cristalina Biosintética Recombinante). Solución Inyectable 100 UI/ ml Fam.10 ml. S.C. / I.V.	Fam	79.7	
Glibenclamida (Gliburida).Tableta Oral 5 mg.	Tab	0.05	
Metformina Clorhidrato. Tableta Oral 500 mg.	Tab	0.26	
Levotiroxina Sódica. Tableta Oral 0.05 mg.	Tab	0.33	
Levotiroxina Sódica Tableta oral 0.1 mg	Tab	0.66	
Tiamazol (Metimazol). Tableta Oral 5 mg.	Tab	2.25	
Gluconato Cálcico. Solución Inyectable 1g/ 10ml. Amp. 10 ml. I.V.	Amp	3.99	
Atropina Sulfato. Solución Inyectable 1mg/ ml .Amp. 1 ml. I.M.	Amp	1.54	
Midazolam Clorhidrato. Solución Inyectable 1mg/ 1ml. Amp. 5 ml. I.M.	Amp	12.32	
Tiopental Sódico. Polvo Liofilizado 1g. Fam. I.V.	Fam	42.24	
Propofol. Solución Inyectable 10mg/ ml. Amp 20 ml. I.V.	Amp	47.06	
Ketamina Clorhidrato. Solución Inyectable 50mg/ ml. Fam. 10 ml. I.M.	Fam	25.36	
Halotano Estándar Inhalador Líquido. Liquido inhalado 99.99% en frasco de 250 ml.	Fco	307.6	
Sevoflurane. Liquido inhalado 100% agua (de 300 a 1000 ppm) en frasco de polietileno naftalato irrompible de 250 ml.	Fco	3142.23	
Lidocaína Clorhidrato (S/ preservantes). Solución Inyectable 2%. Fam. 20 - 30 ml. S.C.- I.T.	Fam	14.03	
Lidocaína Clorhidrato (C/ preservantes). Solución Inyectable 2%. Fam. 20 ml. S.C.	Fam	71.55	
Mepivacaina Clorhidrato 3%. Solución Inyectable. Cartucho 1.8 ml. I.A.	Und	2.54	
Lidocaína clorhidrato + epinefrina (adrenalina) sin preservantes Inyección Lidocaína 2% + epinefrina 1:200,000 en vial de 30 ml. SC.	Fam	62.27	
Mepivacaina 2% con Epinefrina 1:100,000. Solución Inyectable .Cartucho 1.8 ml. I.A.	Und	2.54	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Bupivacaína clorhidrato hiperbarica sin preservantes Inyección para anestesia espinal Bupivacaina 0.75% (7.5 mg/1 ml) en dextrosa 7.25% (72.5 mg/1 ml) en ampolla de 2 ml. IT.	Amp	186.94	
Succinilcolina Cloruro (Suxametonio). Solución Inyectable 100 mg/ml. Amp.10 ml. I.V.	Amp	70.84	
Pancuronio. Solución Inyectable 2mg/ ml. Amp. 2 ml. I.V.	Amp	19.88	
Droperidol. Solución Inyectable 2,5mg/ ml. Fam. 10 ml. I.V.	Fam	12.68	
Fentanilo Citrato. Solución Inyectable 0,05mg/ ml. Fam. 2 ml. I.V.	Fam	7.25	
Naloxona Clorhidrato. Solución Inyectable 0,4mg/ ml. Amp.1 ml. I.V.	Amp	82.75	
Suero Antiofídico Polivalente Liofilizado. Solucion Estándar USP en vial de 10 ml. I.V.	Fco	399.09	
Suero Anticoral Liofilizado. Solucion Estándar USP. Frasco 10 ml. I.V.	Fco	396.25	
Acido úrico enzimático, Kit de 40-200 Det.	Det	0.9	1
Albúmina, Kit de 40-100 Det.	Det	0.49	1
Bilirrubina Total y Directa, Kit de 100-250 Det.	Det	0.71	1
Cloruro, Kit de 40-200 Det.	Det	0.58	1
Colesterol total enzimático, Kit de 100-200 Det.	Det	0.68	1
Colesterol HDL, Kit de 100-400 Det.	Det	0.53	1
Creatinina sin Desproteinización, Kit de 100-300 Det.	Det	0.37	1
Glucosa Cuantitativa en Tiras (Sangre), Fco de 50-100 Tiras.	Tira	2.11	1
Glucosa Cuantitativa en Tiras para Control Normal y Patológico. Set 2 Fco. 2 ml.	Set	131.01	1
Glucosa enzimáticaKit de 500-1000 Det.	Det	0.17	1
Hemoglobina con EstándarSet de 50-100 Det.	Det	0.41	1
Proteínas Totales en Suero y Líquido Cefaloraquídeo, Kit de 250-500 Det.	Det	11.55	1
Suero Control Anormal, Fco de 1-6ml.	Fco	74.5	1
Suero Control Normal, Fco de 1-6ml.	Fco	74.5	1
T4 y sus Complementos, Kit de 50-200 Det.	Det	10.01	1
Transaminasa Glutámico Oxalacética (TGO). Frasco de 10-30ml, .Kit de 100-200 Det.	Det	0.73	1
Transaminasa Glutámico Pirúvica (TGP). Frasco de 10-30ml.Kit de 100-200 Det.	Det	0.73	1
Triglicéridos Enzimáticos., Kit de 150-500 Det.	Det	0.92	1
TSH y sus Componentes, Kit de 500-200 Det.	Det	11.12	1
Antiestreptolisina "O", Kit de 50-100 Det.	Det	1.19	1
Prueba de Embarazo en Orina (Látex), Kit de 1 Det.	Det	1.74	1
Prueba de Factor Reumatoide (Látex), Kit de 50-100 Det.	Det	1.3	1
Prueba para Proteína C Reactiva, Kit de 50-100 Det.	Det	1.58	1
R.P.R. (Sífilis), Kit de 50-150 Det.	Det	0.64	1
Cefaloplastina Activa para Tiempo Parcial con Cloruro de Calcio, Set de 100-200 Det.	Det	1.92	1
Plasma Normal para Coagulación (TP-TPT-FIB), Fco. de 1ml.	Fco	107.47	1
Plasma Anormal para Coagulación (TP-TPT-FIB), Fco. de 1ml.	Fco	96.18	1
Tromboplastina para Tiempo de Protrombina, Kit de 60-120 Det.	Det	3.3	1
Cinta uroanálisis cualitativa (Proteínas, glucosa, cetonas, sangre, leucocitos, nitrito, bilirrubina, urobilinógeno, Ph, densidad)., Fco de 50-100 Tras.	Tira	1.09	1

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Cintas de esterasa leucocitaria con detección de nitritos incorporado:con rango de detección de 10-25 leucocitos por microlitro (µL) MAS prueba de detección de nitritos en orina (ambas pruebas en una sola cinta). Frascos conteniendo 100 cintas o tiras	Cinta	20	1
Sangre Oculta en Heces (Set)., Set de 100-200 Tras.	Tira	14.41	1
Aceite de inmersión, Fco de 100-500ml.	ml	0.71	1
Acido acético glacial, Fco de 1000ml.	ml	0.56	1
Acido carbólico (fenol cristal), Fco de 50-250 g.	g	2.6	1
Acido clorhídrico concentrado 32%, Fco de 1000-2500ml.	ml	0.12	1
Alcohol etílico 98-100%, Fco de 500-1000ml.	ml	0.13	1
Alfanaftol Fco de 100g.	g	3.63	1
Azul de cresil brillante, Fco de 25-100g.	g	7.94	1
Azul de metileno (CI-52015-I.S.CH 1038), Fco de 25-100g.	g	5	1
Fucsina básica, Fco de 25-100g.	g	11.39	1
Giemsa, Fco de 25-100g.	g	22.53	1
Glicerina, Fco de 1000ml.	ml	0.32	1
Hidróxido de potasio, Fco de 250-500g.	g	5.57	1
Metabisulfito de sodio, Fco de 25-100g.	g	1.42	1
Metanol, Fco de 1000-4000ml.	ml	0.1	1
Oxalato de amonio, Fco de 25-100g.	g	8.98	1
P-dimetil benzaldehido, Fco de 25-100g.	g	11.09	1
Safranina, Fco de 25-100g.	g	10.06	1
Violeta de cristal , Fco de 25-100g.	g	5.13	1
Xilol, Fco de 1000-2500ml.	ml	0.13	1
Yodo en cristal , Fco de 25-100g.	g	7.49	1
Alcohol acido 3%	ml	0.05	1
Azul de metileno 0.30%	ml	0.06	1
Azul de metileno fosfatado	ml	0.25	1
Carbol fucsina 0.32%	ml	0.15	1
Cristal Violeta 2%	ml	0.19	1
EDTA 10%	ml	0.22	1
Fenol 4%	ml	0.05	1
Giemsa 0.75%	ml	0.21	1
Yodo 0.33%	ml	0.05	1
Lugol 1%	ml	0.5	1
Safranina 0.25%	ml	0.1	1
Solucion Blanco	ml	0.03	1
Wright 0.30%	ml	0.08	1
Acetona pura, Fco de 4000-5000ml.	ml	0.1	1
Alumbre de potasio, Fco de 500-1000g.	g	0.62	1
EA-65, Fco de 3,785ml.	ml	0.24	1
Fucsina ácida, Fco de 25-100g.	g	25.72	1
Light green, Fco de 25g.	g	45.85	1
Resina sintética (medio de montaje rápido para microscopía), Fco de 400-500ml.	ml	0.94	1

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Algodón 100% absorbente en rollo de 453.5 - 500 gramos, elaborado de fibras 100% algodón, empaque individual.	Roll	20.04	1
Aplicador de madera tamaño standard (15 cm.), con punta algodón Palillo de madera punta de algodón compacto en bolsa de 100 unidades.no esteril	Und	0.28	1
Bolsa para colostomía autoadherible, de plástico, grado medico suave, transparente con filtro de carbon a prueba de olor, cerrada y medida estándar , de una o tres pieza para adultos, empaque individual.	Und	23.56	
Pulsera de identificación para recién nacido, color celeste, de polietileno de baja densidad, broche y orificios adaptables, con tira de papel para datos de identificacion del RN, empaque de 100 unidades	Und	0.8	
Pulsera de identificación para recién nacido, color rosado, de polietileno de baja densidad, broche y orificios adaptables, con tira de papel para datos de identificacion del RN, empaque de 100 unidades	Und	0.8	
Catéter de embolectomía fogarty # 2 FR. Balón 0.5 ml, 80-81cm de largo, radio opaco sin mandril, con alma de acero y marcas de introduccion centimetrico, doble balon uno distal y otro proximal extravascular, para indicar los excesos de presion del balon i	Und	501.51	
Catéter de embolectomía fogarty # 3 FR. Balón 0.5 ml,80-81cm de largo, radio-opaco, sin mandril, con alma de acero y marcas de introducción centimétrico, doble balón uno distal y otro proximal extravascular, para indicar los excesos de presión del balón i	Und	501.51	
Catéter endovenoso flexible (sin aletas ni puerto)Calibre 14 x 50 - 60 mm de longitud,conexión lock,siliconado, flexible, hecho de teflón,y/oPVC punta indeformable,bisel micropulido y tridimensional,radio-opaco no colapsable, atóxico, estéril, empaque in	Und	3.07	
Catéter endovenoso flexible(sin aletas ni puerto)Calibre 16 x 45 - 50 mm de longitud,conexión lock siliconado, flexible, hecho de teflón y/o PVC,punta indeformable, bisel micropulido y tridimensional, radio-opaco no colapsable, atóxico, estéril, empaque	Und	2.78	
Catéter endovenoso flexible(sin aletas ni puerto)Calibre 18 x 32 - 50 mm de longitud,conexión lock siliconado, flexible, hecho de teflón y/o PVC,punta indeformable, bisel micropulido y tridimensional, radio-opaco no colapsable, atóxico, estéril, empaque	Und	2.58	
Catéter endovenoso flexible(sin aletas ni puerto)Calibre 20 x 32 - 50 mm de longitud, conexión lock siliconado, flexible, hecho de teflón y/o PVC, punta indeformable,bisel micropulido y tridimensional, radio-opaco no colapsable, atóxico,estéril,empaque i	Und	2.64	
Catéter endovenoso flexible(sin aletas ni puerto)Calibre 22 x 25 - 32 mm de longitud,conexión lock siliconado, flexible, hecho de teflón y/o PVC, punta indeformable,bisel micropulido y tridimensional, radio-opaco no colapsable, atóxico,estéril,empaque i	Und	2.64	
Catéter endovenoso flexible(sin aletas ni puerto)Calibre 24 x 20 - 25 mm de longitud, conexión lock siliconado, flexible, hecho de teflón, punta indeformable, bisel micropulido y tridimensional, radio-opaco no colapsable, atóxico, estéril, empaque indiv	Und	2.64	
Catéter para oxigeno sin mascarilla con cánula bilateral, 100 cm. de longitud ,hecha de vinil o de PVC, suave en el área nasal, con punta angulada, estéril, empaque individual.	Und	5.36	
Catéter para oxigeno con mascarilla para adultos, mínimo 150 cm. de longitud, hecha de vinil o de PVC, estéril, empaque individual.	Und	10.35	
Catéter para oxigeno con mascarilla Pediátrica, mínimo 150 cm. de longitud ,hecha de vinil o de PVC, estéril, empaque individual.	Und	8.09	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Cateter Venoso Central Para vena basilica con cateter 0.8*1.4mm,18G, 70cm de largo con flujo de goteo 7ml/minut con canula intravenosa no 16g*50mm,esteril en empaque individual	Und	141	
Cepillo para lavado de manos quirúrgico-preoperatorio de 8.25 - 9 cm. x 4.3 - 5 cm., autoclaveable, de plástico, con dos agarraderas laterales simétricas y cerdas de nylon, estéril en empaque individual.	Und	22.22	
Cinta métrica de plástico, 150 - 180 cm. de largo x 1-1.6 cm. de ancho, de plástico, empaque individual.	Und	44.13	
Cinta testigo para esterilización a vapor por autoclave. Rollo de 1.85 - 2.5 cm. x 50 - 60 metros de largo, de papel Krepado que al ser sometida a condiciones típicas de esterilización en autoclaves de vapor (1 Kg. de presión y una temperatura de 122° C)	Roll	33.84	
Bolsas recolectoras de orina para niños y niñas, con capacidad de 60 - 100 ml, Graduado, de polietileno, no tóxica, con sostén adhesivo en su extremo proximal, estéril, empaque individual.	Und	0.61	1
Crema electro-conductiva (Tubo de 60 gramos), a base de hidro gel sólido.	Tbo	30.08	
Depresor de madera 15 cm. largo x 2 cm. de ancho (6´´ x 3/4''), de madera blanca libre de astillas, empaque 100 und.	Und	0.07	1
Dispositivo Intrauterino T de Cobre, estéril, empaque individual	Und	26.8	
Dreno modelo PENROSE, 18 cm. x 2.5 cm. ancho (1") , de látex, estéril, en empaque individual.	Und	6.13	
Dreno modelo PENROSE, 18 cm. x 0.65 cm. de ancho (¼"), de látex, estéril, en empaque individual.	Und	5.54	
Cinta Adhesiva Quirurgica de 7.5 cm de ancho10mts de largo.	Roll	6.17	
Electrodos descartables de monitor para adulto, autoadhesivo hipoalergénico, soporte microporoso.	Und	0.91	
Electrodos descartables de monitor para niñas y niños, autoadhesivo hipoalergénico, soporte microporoso.	Und	1.69	
Cinta adhesiva quirúrgica de plástico 5 cm. de ancho x 9-10 metros de largo, de polietileno perforada, libre de látex, transparente, porosa, impermeable, hipoalergénica.	Roll	6.18	
Cinta adhesiva quirúrgica de plástico 10 cm. de ancho x 9-10 metros de largo, de polietileno perforada, libre de látex, transparente, porosa, impermeable, hipoalergénica.	Roll	20.82	
Espátula cervical 18 cm. de largo, de madera blanca libre de astillas o de plástico. Empaque de 100 unidades.	Caj	87	
Fijador de lámina (frasco de 3.5 onzas), Envase tipo Spray.	Fco	55.88	1
Gasa quirúrgica depurada, Pieza plegable de 90 cm. de ancho x 90 a 100 metros de largo, Pieza plegale, fabricada con hilos100 % algodón, según USP XXIII Tipo V: Urdimbre 20 a 24 hilos por pulgada cuadrada (2.5 cm2).	Pza	155.25	1
Guante para exploración descartable ambidiestro estéril # 6 ½, o su equivalente a letra a S (Small) Látex 100%, lubricados con fécula de maíz, optima resistencia a la tensión, excelente sensibilidad al tacto, empaque individual de cada par.	Par	1.94	
Guante para exploracion descartable ambidiestro esteril (bolsa individual) No. 7.o su equivalente en letra M (Medium) Látex 100%, lubricados con fécula de maíz, optima resistencia a la tensión, excelente sensibilidad al tacto, empaque individual de cada p	Par	1.94	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Guante para exploracion descartable ambidiestro esteril(bolsa individual) #. 7½ .o su equivalente en letra M. Látex 100%, lubricados con fécula de maíz, optima resistencia a la tensión, excelente sensibilidad al tacto, empaque individual de cada guante d	Par	1.94	1
Guante para exploraciondescartable ambidiestro esteril(bolsa individual) #.8 su equivalente en letra L (Large) Látex 100%, lubricados con fécula de maíz, optima resistencia a la tensión, excelente sensibilidad al tacto, empaque individual de cada guante	Par	1.94	
Guante quirúrgico # 6½. Látex 100%, lubricados con fécula de maíz, altamente flexibles, óptima resistencia a la tensión, excelente sensibilidad, hipoalergénicos, estériles, empaque individual de cada par.	Par	2.44	
Guante para exploracion descartable no esteril No. 6 ½. Caja de 100 unidades.	Und	0.41	
Guante quirúrgico # 7, Látex 100%, ligeramente lubricados con fécula de maíz, altamente flexibles, óptima resistencia a la tensión, excelente sensibilidad, hipoalergénicos, estériles, empaque individual de cada par.	Par	2.44	
Guante para exploracion descartable no esteril No. 7. Caja de 100 unidades	Und	0.41	
Guante para exploracion descartable no esteril No. 7½. Caja de 100 unidades	Und	0.43	
Guante para exploraciondescartable no esteril No. 8. Caja de 100 unidades	Und	0.41	
Guante quirúrgico # 7½, Látex 100%,ligeramente lubricados con fécula de maíz, altamente flexibles, óptima resistencia a la tensión, excelente sensibilidad, hipoalergénicos, estériles, empaque individual de cada par.	Par	2.44	
Guante quirúrgico # 8, Látex 100%, ligeramente lubricados con fécula de maíz, altamente flexibles, óptima resistencia a la tensión, excelente sensibilidad, hipoalergénicos, estériles, empaque individual de cada par.	Par	2.44	
Hoja de bisturí # 10, de acero inoxidable, estéril, empaque individual de aluminio anticorrosivo que permiten largos períodos de almacenamiento	Und	1.99	
Hoja de bisturí # 11, de acero inoxidable, estéril, empaque individual de aluminio anticorrosivo que permite largos períodos de almacenamiento	Und	1.99	
Hoja de bisturí # 12, de acero inoxidable, estéril, empaque individual de aluminio anticorrosivo que permiten largos períodos de almacenamiento	Und	1.99	
Hoja de bisturí # 15, de acero inoxidable, estériles, empaque individual de aluminio anticorrosivo que permite largos períodos de almacenamiento	Und	1.99	
Hoja de bisturí # 23, de acero inoxidable, estéril, empaque individual de aluminio anticorrosivo que permite largos períodos de almacenamiento	Und	1.99	
Jalea lubricante (Tubo de 110 - 150 gramos), gelatina purificada, transparente, inodora con bacteriostático.	Tbo	20.11	
Llave de 3 vías (Adaptador multiflujo) descartable, 2 conectores hembras conexión lock y el conector macho conexión slip, con asa para rotación manual e indicador de flujo. De policarbonato princilpalmente, cuerpo transparente y translucida, presión verif	Und	3.35	
Microgotero graduado para infusión de suero de 0 a 150 ml, con conector en Y, 150 - 160 cm de largo. Cámara de goteo flexible y transparente, hecho de látex, suave, moldeable, resistente a acodadura, conexión lock, estéril, empaque individual.	Und	7.68	
Cinta adhesiva quirúrgica MICROSPOROSA, 2.5 cm de ancho x 9 -10 metros de largo. Soporte microsporoso a base de fibras de celulosa no tejidas que permite la transpiración y ventilación de la piel, adhesivo acrílico e hipoalergénico.	Roll	3.69	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Cinta adhesiva quirúrgica MICROSPOROSA, 5 cm de ancho x 9 - 10 metros de largo. Soporte microsporoso a base de fibras de celulosa no tejidas que permite la transpiración y ventilación de la piel, adhesivo acrílico e hipoalergénico.	Roll	7.36	
Pera de hule con capacidad de 3 onzas p/succión, de goma elástica, empaque individual.	Und	12.52	
Pinza umbilical (clamp), Pinza dentada de polivinilo/polipropileno, estéril, empaque individual.	Und	0.54	
Set descartable estéril para infusión de solución, con aguja calibre 22 x 38 mm de longitud, dispositivo en Y para inyección, con regulador de flujo y longitud del tubo de 150 a 180 cm, conexión lock, Cámara de goteo flexible y transparente, hecho de lát	Und	1.83	
Set endovenoso (aguja con aletas) Calibre 19 x 19 - 20 mm de longitud, tubo 30 cm de largo con tapón separable, conexión slip, Aletas de fijación flexibles antideslizantes, aguja de acero cromoniquel inoxidable, con bisel bidimensional micropulido y micro	Und	1.38	
Set endovenoso (aguja con aletas) Calibre 21 x 19 - 20 mm de longitud, tubo 30 cm de largo con tapon separable, conexión slip, Aletas de fijación flexibles antideslizantes, aguja de acero cromoniquel inoxidable, con bisel bidimensional micropulido y micro	Und	0.44	
Set endovenoso (aguja con aletas) Calibre 22 x 19 - 20 mm de longitud, tubo 30 cm de largo con tapon separable, conexión slip, Aletas de fijación flexibles antideslizantes, aguja de acero cromoniquel inoxidable, con bisel bidimensional micropulido y micro	Und	1.38	
Set endovenoso (aguja con aletas) Calibre 23 x 19 - 20 mm de longitud, tubo 30 cm de largo con tapon separable, conexión slip, Aletas de fijación flexibles antideslizantes, aguja de acero cromoniquel inoxidable, con bisel bidimensional micropulido y micr	Und	1.46	
Set endovenoso (aguja con aletas) Calibre 25 x 15 - 19 mm de longitud, tubo 30 cm de largo con tapon separable, conexión slip, Aletas de fijación flexibles antideslizantes, aguja de acero cromoniquel inoxidable, con bisel bidimensional micropulido y micr	Und	2.13	
Sonda para esófago, MODELO Sengstaken Blakemore, calibre 18 x 100 cm. de longitud, de tres vías, De látex, punta cerrada, con cuatro orificios, dos balones, graduado, radio-opaco, estéril, empaque individual.	Und	2415.77	
Sonda para esófago, MODELO Sengstaken blakemore, calibre 16 x 100 cm. de longitud, de tres vías, De látex, punta cerrada, con cuatro orificios, dos balones, graduado, radio-opaco, estéril, empaque individual.	Und	2415.77	
Sonda de aspiración transparente # 8, longitud mínima 38 - 40 cm, De PVC grado médico, extremidad abierta recta, roma, con o sin orificio lateral, estéril, empaque undividual.	Und	15.03	
Sonda en "T" p/drenaje # 10 x 30 cm. (12'') de largo, De látex, estéril en empaque individual.	Und	17.79	
Sonda en "T" p/drenaje No. 12 de 12" (estéril), de latex esteril, en empaque individual.	Und	17.79	
Sonda en "T" p/drenaje # 14 x 30 cm. (12'') de largo, De látex, estéril en empaque individual.	Und	17.79	
Sonda en "T" p/drenaje # 16 x 30 cm. (12'') de largo, De látex, estéril en empaque individual.	Und	17.79	
Sonda en "T" p/drenaje # 18 x 30 cm. (12'') de largo, De látex, estéril en empaque individual.	Und	17.79	
Sonda en "T" p/drenaje # 20 x 30 cm. (12'') de largo, De látex, estéril en empaque individual.	Und	26.4	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Sonda para drenaje urinario Tipo Foley, # 22, tres vías, con balón de autoretención de 30 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.89	
Sonda para drenaje urinario Tipo Foley, # 24, tres vías, con balón de autoretención de 30 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual .	Und	5.89	
Sonda para drenaje urinario Tipo Foley, # 22, dos vías, con balón de autoretención de 30 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.48	
Sonda para drenaje urinario Tipo Foley, # 24, dos vías, con balón de autoretención de 30 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.48	
Sonda para drenaje urinario Tipo Foley, # 8, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	7.68	
Sonda para drenaje urinario Tipo Foley, # 10, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	6.46	
Sonda para drenaje urinario Tipo Foley, # 12, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.48	
Sonda para drenaje urinario Tipo Foley, # 14, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.48	
Sonda para drenaje urinario Tipo Foley, # 16, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual .	Und	5.28	
Sonda para drenaje urinario Tipo Foley, # 18, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.19	
Sonda para drenaje urinario Tipo Foley, # 20, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	5.28	
Sonda para drenaje urinario Tipo Foley, # 22, dos vías, con balón de autoretención de 5 ml, longitud 40 cm. (16''), De látex recubierta con silicona, con válvula para jeringa, estéril, empaque individual.	Und	4.7	
Sonda nasogástrica descartable (tipo levine) # 18 x 120 - 130 cm de longitud, De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, 4 orificios laterales, estéril, empaque individual.	Und	2.14	
Sonda nasogástrica descartable (tipo levine) # 16 x 120 - 130 cm de longitud. De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, 4 orificios laterales, estéril, empaque individual.	Und	2.14	
Sonda nasogástrica descartable pediátrica # 10 x 75 - 105 cm de longitud, De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	2.5	
Sonda nasogástrica descartable pediátrica # 12 x 75 - 105 cm de longitud, De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	2.5	
Sonda nasogástrica para prematuro # 5 x 37.5 - 40 cm de longitud. De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	1.26	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Sonda nasogástrica para prematuro # 5 de 92 cm de largo (36”).De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	1.76	
Sonda nasogástrica para niño # 8 x 105 cm. (42”) de longitud. De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	1.45	
Sonda Orgastrica para alimentacion No 8 de 15”	Und	0.45	
Sonda nasogástrica para niño # 8 x 37.5 - 40 cm. de longitud. De PVC, transparente flexible, atóxico, punta roma, atraumática, con marcas para el control de la introducción, estéril, empaque individual.	Und	0.94	
Catéter torácico recto # 16, transparente, con línea radio-opaca, marcas de introducción cada 2cm, longitud 45 - 50 cm. De PVC transparente, conexión no traumática proximal, con 6 orificios laterales, marcas de introducción cada 2 cm, de 2 a 24 cm, despu	Und	22.54	
Catéter torácico recto # 18, transparente, con línea radio-opaca, marcas de introducción cada 2cm, longitud 45 - 50 cm, De PVC transparente, conexión no traumática proximal, con 6 orificios laterales, marcas de introducción cada 2 cm, de 2 a 24 cm, despu	Und	30.52	
Catéter torácico recto # 20, transparente, con línea radio-opaca, marcas de introducción cada 2cm, longitud 45 - 50 cm, De PVC transparente, conexión no traumática proximal, con 6 orificios laterales, marcas de introducción cada 2 cm, de 2 a 24 cm, despu	Und	30.52	
Catéter torácico recto # 28, transparente, con línea radio-opaca, marcas de introducción cada 2cm, longitud 45 - 50 cm,De PVC transparente, conexión no traumática proximal, con 6 orificios laterales, marcas de introducción cada 2 cm, de 2 a 24 cm, despué	Und	35.39	
Sonda uretral nelaton # 8, 40 cm (16”) de longitud. De latex, color rojo, punta redondada y sólida, de un orificio, atraumatica, radio-opaco.	Und	4.15	
Sonda uretral nelaton # 14, 40 cm. (16”) de longitud, De látex, color rojo, punta redondeada y sólida, de un orificio, atraumática, radio-opaco.	Und	7.27	
Termómetro oral, escala grados centígrados (35.5° - 41° C). De vidrio transparente con mercurio químicamente puro, graduado en grados C, con subdivisiones de décimas de grado, empaque individual.	Und	2.85	
Termómetro rectal, escala grados centígrados (35.5° - 41° C). De vidrio transparente con mercurio químicamente puro, graduado en grados C, con subdivisiones de décimas de grado, empaque individual.	Und	2.85	
Toalla sanitaria obstétrica 25 - 27.5 cm (10-11”) de largo x 8.75 cm (3 ½”) de ancho 11 - 12 gramos de peso. Cojinete a base de pulpa de celulosa, papel facial y tela no tejida.	Und	1.15	
Tubo de drenaje urinario (50 mm de diámetro y mínimo 90 cm de largo) con bolsa c/capacidad 2,000 ml, Tubo suave, de PVC, resistente a acodaduras, estéril, empaque individual.	Und	2.73	
Venda de gasa 5 cm de ancho x 9 - 10 mts de largo, Fabricada con gasa de tejido cerrado, trama 20 x 24 hilos por pulgada cuadrada (2.5 cm2), contiene pequeña cantidad de apresto, para darle mayor cuerpo.	Roll	1.15	
Venda de gasa 10 cm de ancho x 9 - 10 mts de largo, Fabricada con gasa de tejido cerrado, trama 20 x 24 hilos por pulgada cuadrada (2.5 cm2), contiene pequeña cantidad de apresto, para darle mayor cuerpo.	Roll	2.2	
Venda elástica de 5 cm de ancho x 4.5 - 5 mts de largo (fuerte elasticidad y alta compresión), Con 2 clamps elásticos, fabricada 87% algodón y 13% látex (hule), en tejido plano.	Roll	3.07	

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Venda elástica de 10 cm de ancho y 4.5 - 5 mts de largo (fuerte elasticidad y alta compresión), Con 2 clamps elásticos, fabricada 87% algodón y 13% látex (hule), en tejido plano.	Roll	5.04	
Venda elástica de 15 cm de ancho x 4.5 - 5 mts de largo (fuerte elasticidad y alta compresión), Con 2 clamps elásticos, fabricada 87% algodón y 13% látex (hule), en tejido plano.	Roll	7.39	
Media tubular (stoquinete sintetico) 5 cm de ancho * 24-25 metros de largo. Tejido tubular de fibra acrílica, empaque individual.	Roll	74.5	
Media tubular (stoquinete sintetico) 10 cm de ancho * 24-25 metros de largo. Tejido tubular de fibra acrílica, empaque individual.	Roll	119.09	
Media tubular (stoquinete sintetico) de 15 cm de ancho * 24-25 metros de largo.Tejido tubular de fibra acrílica, empaque individual.	Roll	164.94	
Venda de yeso, 5 cm (2") de ancho x 2.75 a 3 mts de longitud (Fraguado 3-5 minutos), Venda enyesada de gasa (100% algodón), consistencia cremosa, alta adhesión entre capas, mínima pérdida de yeso, empaque individual (bolsa resistente a humedad).	Roll	2.51	
Venda de yeso, 10 cm (4") de ancho x 4.5 a 5 mts de longitud (Fraguado 3-5 minutos), Venda enyesada de gasa (100% algodón), consistencia cremosa, alta adhesión entre capas, mínima pérdida de yeso, empaque individual (bolsa resistente a humedad).	Roll	6.51	
Venda de yeso, 15 cm (6") de ancho x 4.5 a 5 mts de longitud, Venda enyesada de gasa (100% algodón), consistencia cremosa, alta adhesión entre capas, mínima pérdida de yeso, empaque individual (bolsa resistente a humedad).	Roll	9.35	
Venda Smarch 15 cm (6") de ancho x 5 - 6 mts de longitud, Venda de látex, empaque individual.	Roll	232.33	
Vendaje ortopédico de algodón (Watta), 3 mm de espesor, 5 cms de ancho x 5-6 mts de longitud, Venda de algodón laminado impermeable, empaque individual.	Roll	3.63	
Vendaje ortopédico de algodón (Watta), 3 mm de espesor, 10 cms de ancho x 5-6 mts de longitud, Venda de algodón laminado impermeable, empaque individual.	Roll	5.25	
Vendaje ortopédico de algodón (Watta), 3 mm de espesor, 15 cms de ancho x 5-6 mts de longitud, Venda de algodón laminado impermeable, empaque individual.	Roll	7.52	
Aguja para anestesia epidural con bisel tipo TOUHY, calibre 18, longitud 80 - 90 mm (3¼ -3½"), conexión lock, Mandril con marca indicando la orientación del bisel. De acero inoxidable, con graduación cada 1 cm, para el control de la profundidad, Pabelló	Und	33.84	
Aguja para anestesia espinal, bisel en "punta de lápiz" (Tipo Whitakre) calibre 22, longitud 90 mm (3½"), Pabellón plástico transparente, mandril con marca indicando la localización del orificio distal, aguja de pared fina de acero inoxidable, descartabl	Und	22.5	
Aguja para anestesia espinal, bisel en "punta de lápiz" (Tipo Whitakre) calibre 25, longitud 90 mm (3½"), Pabellón plástico transparente, mandril con marca indicando la localización del orificio distal, aguja de pared fina de acero inoxidable, descartabl	Und	22.5	
Cal sodada (similar a soda line), recipiente de 1- 5kg (bolsa -frasco). Gránulos absorbentes de CO2, de color blanquecino, cambia de color a violeta cuando la absorción se ha agotado.	Kg	118.9	
Cánula orofaríngea para adulto (Modelo GUEDEL) # 3, 80 - 90 mm de longitud. De polietileno lineal de baja densidad, extremo distal redondeado, atraumatico, estéril, empaque individual.	Und	5.81	

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Cánula orofaríngea para adulto (Modelo GUEDEL) # 4, 90 - 100 mm de longitud. De polietileno lineal de baja densidad, extremo distal redondeado, atraumatico, estéril, empaque individual.	Und	5.81	
Cánula oranfaringea (Modelo GUEDEL) #5, 100-112 mm de longitud. De polietileno lineal de baja densidad, extremo distal redondeado, atraumatico, estéril, empaque individual.	Und	5.81	
Cánula orofaríngea para uso pediátrico (Modelo GUEDEL) # 00, 50 - 60 mm de longitud. De polietileno lineal de baja densidad, extremo distal redondeado, atraumatico, estéril, empaque individual.	Und	5.81	
Cánula orofaríngea para uso pediátrico (Modelo GUEDEL) # 1, 70 - 80 mm de longitud. De polietileno lineal de baja densidad, extremo distal redondeado, atraumatico, estéril, empaque individual.	Und	5.81	
Canula Orofaringea modelo No 2 94mm	Und	5.53	
Tubo endotraqueal con balón, punta Magill # 4 , diámetro interno 4 mm x 20 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada, e	Und	10.26	
Tubo endotraqueal con balón, punta Magill # 4.5, diámetro interno 4.5 mm x 20 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 5, diámetro interno 5 mm x 25 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada, es	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 5.5, diámetro interno 5.5 mm x 25 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduad	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 6, diámetro interno 6 mm x 30 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada,	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 6.5, diámetro interno 6.5 mm x 30 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, gradua	Und	16.89	
Tubo endotraqueal con balón, punta Murphy # 7, diámetro interno 7 mm x 32.5 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada	Und	10.26	
Tubo endotraqueal con balón, punta Murphy # 7.5, diámetro interno 7.5 mm x 32.5 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, grad	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 8, diámetro interno 8 mm x 32.5 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, graduada	Und	9.33	
Tubo endotraqueal con balón, punta Murphy # 8.5, diámetro interno 8.5 mm x 32.5 cm de longitud, con conector de 15 mm, bisel 37°, De PVC, transparente, con línea radio-opaca, balón baja presión, línea para inflar el balón con válvula antirretorno, grad	Und	9.33	

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Tubo endotraqueal sin balón, punta Murphy # 2, diámetro interno 2 mm x 16.5 cm de longitud, con conector de 15 mm, bisel 37°. De PVC, transparente, con línea radio-opaca, marca visual distal negra, con graduación, estéril, empaque individual.	Und	7.06	
Tubo endotraqueal sin balón, punta Murphy # 2.5, diámetro interno 2.5 mm x 16.5 cm de longitud, con conector de 15 mm, bisel 37°. De PVC, transparente, con línea radio-opaca, marca visual distal negra, con graduación, estéril, empaque individual.	Und	7.06	
Tubo endotraqueal sin balón, punta Murphy # 3, diámetro interno 3 mm x 16.5 cm de longitud, con conector de 15 mm, bisel 37°. De PVC, transparente, con línea radio-opaca, marca visual distal negra, con graduación, estéril, empaque individual.	Und	8.14	
Tubo endotraqueal sin balón, punta Murphy # 3.5, diámetro interno 3.5 mm x 16.5 cm de longitud, con conector de 15 mm, bisel 37°. De PVC, transparente, con línea radio-opaca, marca visual distal negra, con graduación, estéril, empaque individual.	Und	6.32	
Tubo endotraqueal sin balón, punta Murphy # 4.5, diámetro interno 4.5 mm x 23 cm de longitud, con conector de 15 mm, bisel 37°. De PVC, transparente, con línea radio-opaca, marca visual distal negra, con graduación, estéril, empaque individual.	Und	8.87	
Tubo transparente corrugado de reinhalación con bolsa y c/busching de 15 mm x 91.5 cm (36") de largo. De plástico, transparente, empaque individual.	Set	49.9	
Tubo transparente corrugado de reinhalación con bolsa y c/busching de 22 mm x 81 cm (32") de largo, De plástico, transparente, empaque individual.	Set	2820	
Tubo descartable para traqueotomía con cánula interna # 3, De PVC, confortable y flexible, con balón, cánula de Polietileno, obturador de inserción incluido, estéril, empaque individual.	Set	820	
Tubo descartable para traqueotomía con cánula interna # 4, De PVC, confortable y flexible, con balón, cánula de Polietileno, obturador de inserción incluido, estéril, empaque individual.	Set	689.63	
Tubo descartable para traqueotomía con cánula interna # 8, De PVC, confortable y flexible, con balón, cánula de Polietileno, obturador de inserción incluido, estéril, empaque individual.	Set	689.63	
Catgut quirúrgico crómico # 0 c/aguja ahusada, ½ circulo, de 35 - 37mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	2.67	
Catgut quirúrgico crómico # 0 c/aguja ahusada, ½ circulo, de 25 - 26 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	2.83	
Catgut quirúrgico crómico # 1 c/aguja ahusada, ½ circulo, de 40 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	2.83	
Catgut quirúrgico crómico # 2-0 c/aguja ahusada, ½ circulo, de 40 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	2.67	
Catgut quirúrgico crómico # 2-0 c/aguja ahusada, ½ circulo, de 25 - 26 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	10.95	

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Catgut quirúrgico crómico # 3-0 c/aguja ahusada, ½ circulo, de 25 - 26 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	10.95	
Catgut quirúrgico simple # 2-0 c/aguja ahusada, ½ circulo, de 25 - 26 mm, hebra 70 - 75 cm de longitud, Sutura absorbible, derivado de colágeno de ovejas y de bovinos sanos, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	5.71	
Nylon monofilamento # 0 c/aguja reverso cortante, 3/8 de círculo, de 20 - 24 mm, hebra mínimo 45 cm de longitud, Sutura sisntética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, mo	Sbe	2.13	
Nylon monofilamento # 2-0 c/aguja reverso cortante, 3/8 de círculo de 26 mm, hebra mínimo 45 cm de longitud, Sutura sisntética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, monta	Sbe	2.41	
Nylon monofilamento # 3-0 c/aguja reverso cortante, 3/8 de círculo de 24 mm, hebra mínimo 75 cm de longitud, Sutura sisntética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, montad	Sbe	2.13	
Nylon monofilamento # 4-0 c/aguja reverso cortante, 3/8 de círculo de 18 - 20 mm, hebra mínimo 45 cm de longitud, Sutura sisntética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, m	Sbe	2.13	
Nylon monofilamento # 5-0 c/aguja reverso cortante, 3/8 de círculo de 19 mm, hebra mínimo 45 cm de longitud, Sutura sisntética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, montad	Sbe	2.41	
Nylon monofilamento # 6-0 c/aguja reverso cortante, 3/8 de círculo de 16 mm, hebra mínimo 45 cm de longitud, Sutura sintética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, montada	Sbe	2.01	
Nylon monofilamento # 10-0 c/aguja espatulada, 3/8 de círculo de 64 - 65 mm, hebra mínimo 30 cm de longitud, Sutura sintética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, montada	Sbe	165.18	
Nylon monofilamento # 2 c/aguja reverso cortante, 3/8 de círculo de 76 - 77 mm, hebra mínimo 75 cm de longitud, Sutura sintética monofilamento no absorbible, de polímeros alipáticos de cadena larga de nylon 6 ó 6.6, con diámetro cilíndrico uniforme, monta	Sbe	2.01	
Sutura de ácido glicólico (poliglactina) # 0, con aguja ahusada, ½ circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio,	Sbe	15.59	
Sutura de ácido glicólico (poliglactina) # 2-0, con aguja ahusada, ½ circulo, de 35 - 37 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio	Sbe	16.99	
Sutura de ácido glicólico (poliglactina) # 2-0, con aguja reverso cortante, 3/8 circulo, de 30 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de	Sbe	18.22	

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Sutura de ácido glicólico (poliglactina) # 4-0, con aguja ahusada, ½ circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio	Sbe	16.58	
Sutura de ácido glicólico (poliglactina) # 1, con aguja ahusada, ½ circulo, de 35 - 36 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio,	Sbe	21.51	
Sutura de ácido glicólico (poliglactina) # 5-0, con aguja reverso cortante, 3/8 de circulo, de 19 -20 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estear	Sbe	19.75	
Sutura de ácido glicólico (poliglactina) # 5-0, con aguja ahusada, ½ circulo, de 15 - 17 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio	Sbe	2.01	
Sutura de ácido glicólico (poliglactina) # 6-0, con aguja ahusada, ½ circulo, de 15 - 17 mm, hebra mínimo 70 cm de longitud, Sutura absorbible sintética, compuesta de ácido poliglicólico cubierto con poliglactina o policaprolactona y estearato de calcio	Sbe	2.01	
Polipropileno # 4-0 con aguja ahusada, ½ circulo, de 15 - 17 mm, hebra mínimo 70 cm de longitud, Sutura sintética monofilamento no absorbible, de estero isómero isotáctico cristalino de polipropileno, hebra montada en aguja de acero inoxidable, estéril, e	Sbe	19.45	
Polidioxanona # 2-0 con aguja ahusada, ½ circulo 36 - 37 mm, largo mínimo de la hebra 70 cm. Sutura sintética monofilamento absorbible, de polimero de poliéster, hebra montada en aguja de acero inoxidable, estéril, empaque individual.	Sbe	19.75	
Sutura Seda negra trenzada No. 1 hebra montada en aguja atraumatica de acero inoxidable cilindrica ½ círculo 35mm, largo minimo de la hebra 75cm, esteril, en empaque individual.	Sbe	2.25	
Seda negra trenzada # 0, con aguja ahusada, ½ circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Seda natural multifilamento trenzada, no absorbible, de proteína natural llamada fibroína, hebra montada en aguja de acero inoxidable, estéril, empaque i	Sbe	2.25	
Seda negra trenzada # 2-0, con aguja ahusada, ½ circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Seda natural multifilamento trenzada, no absorbible, de proteína natural llamada fibroína, hebra montada en aguja de acero inoxidable, estéril, empaqu	Sbe	2.25	
Seda negra trenzada # 2-0, con aguja reverso cortante, 3/8 de circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Seda natural multifilamento trenzada, no absorbible, de proteína natural llamada fibroína, hebra montada en aguja de acero inoxidable, es	Sbe	2.25	
Seda negra trenzada # 3-0, con aguja ahusada, ½ circulo, de 25 - 26 mm, hebra mínimo 70 cm de longitud, Seda natural multifilamento trenzada, no absorbible, de proteína natural llamada fibroína, hebra montada en aguja de acero inoxidable, estéril, empaque	Sbe	2.25	
Aguja hipodérmica estéril descartable p/jeringa conexión lock, Calibre 21 x 32 - 38 mm de longitud, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.19	

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Aguja hipodérmica estéril descartable p/jeringa conexión lock, Calibre 22 x 32 - 38 mm de longitud, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.19	
Aguja hipodérmica estéril descartable p/jeringa conexión lock, Calibre 23 x 25 - 32 mm de longitud, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.52	
Aguja hipodérmica estéril descartable p/jeringa conexión lock, Calibre 24 x 25 mm de longitud, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.52	
Jeringa descartable de 3 ml, conexión lock, 3 piezas, con aguja Calibre 23 x 32 - 38 mm de longitud, Jeringa de polipropileno translucido, capacidad 3 ml, intervalo de graduación 0.1ml, estéril, empaque individual.	Und	0.45	
Jeringa descartable de 5 ml, conexión lock, 3 piezas, con aguja Calibre 22 x 32 - 38 mm de longitud, Jeringa de polipropileno translucido, capacidad 5 ml, intervalo de graduación 0.2 ml, estéril, empaque individual.	Und	0.46	
Jeringa descartable de 10 ml, conexión lock, 3 piezas, con aguja Calibre 22 x 32 - 38 mm de longitud, Jeringa de polipropileno translucido, capacidad 10 ml, intervalo de graduación 0.5 ml, estéril, empaque individual	Und	0.69	1
Jeringa descartable para insulina (100 UI / 1 ml) c/aguja calibre 26 - 27 x 12 - 13 mm de longitud, Jeringa de polipropileno translucido, capacidad 1 ml, intervalo de graduación 0.01ml, estéril, empaque individual.	Und	0.46	
Jeringa descartable para insulina (100 UI / 1 ml) c/aguja calibre 28 - 30 x 10.7 - 13.7 mm de longitud, aguja preesamblada al soporte de la jeringa, Jeringa de polipropileno translucido, capacidad 1 ml, intervalo de graduación 0.01ml, estéril, empaque ind	Und	0.03	
Jeringa de vidrio de 10 ml, con émbolo, pico metálico con rosca (conexión Lock). De vidrio resistente, pico de acero inoxidable, con graduación permanente.	Und	106.28	
Jeringa de vidrio 20 ml con émbolo, pico metálico con rosca (conexión Lock). De vidrio resistente, pico de acero inoxidable, con graduación permanente.	Und	32.18	
Jeringa de asepto de vidrio con capacidad de 4 onzas, De vidrio resistente, con bulbo de goma, con capacidad de 4 onzas.	Und	118.73	
Aceite de turbina (frasco de 120 - 200 ml), Lubricante, envase individual	Fco	129.22	
Aguja corta descartable, calibre 27 x 25 mm de longitud, conexión lock, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.5	
Aguja larga descartable, calibre 27 x 40 - 42 mm de longitud, conexión lock, Aguja de acero inoxidable, siliconizada, punta recortada en forma de lanceta, corte triple, para reducción del trauma, estéril, empaque individual.	Und	0.51	
Banda de celuloide (empaque de 100 unidades) Bolsa de 100 unidades	Bls	14.42	
Banda de matriz metálica 0.038 mm (0.0015") de espesor x 6.35 mm (1/4") de ancho x 300 cm (120") de largo, En bolsa de 12 unidades	Bls	9.93	
Base y catalizador hidróxido de calcio (Pastas Dycal), 13 gr base + 11 gr catalizador	Set	78.28	
Eugenol (Frasco de 120 ml),	Fco	136.52	
Eyector de saliva (Descartable), Bolsa de 100 unidades.	Und	0.53	
Vaso de vidrio dappen, De vidrio resistente	Und	15.54	
Fresa de Diamante cono Invertido # 31 alta velocidad De acero inoxidable	Und	28.35	

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Fresa de Diamante Cono Invertido # 34 de alta velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Cono Invertido # 35 de Alta Velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Redondo # 2 Alta Velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Redondo # 3 Alta Velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Redondo # 4 Alta Velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Cilindrica # 700 Alta Velocidad De acero inoxidable	Und	28.35	
Fresa de Diamante Cilindrica # 701 Alta Velocidad De acero inoxidable	Und	28.35	
Limadura de plata con zinc en tableta, Empaque de 80 tabletas	Onz	63.79	
Mercurio metálico (Frasco de 1 onza)	Onz	14.35	
Oxido de zinc dental (Frasco de 4 onzas)	Onz	14.32	
Papel para articular (Caja de 300 unidades)	Caj	59.74	
Pasta para profilaxis (Tubo 50 grs)	Tbo	54.87	
Aguja múltiple para extracción de sangre en tubo al vacío # 20 * 1 ½ mm de largo, Caja de 100 unidades.	Und	1.19	1
Aguja múltiple para extracción de sangre en tubo al vacío # 21 * 1 ½ mm de largo, Caja de 100 unidades.	Und	1.12	1
Aguja wintrobe, Caja de 12 unidades.	Und	158.64	
Aplicadores de madera sin punta de algodón, Caja de 100-1000 unidades.	Und	0.04	1
Bandeja para tinción de acero inoxidable, Unidad	Und	7615.13	1
Beaker de vidrio 100 ml, Caja de 6-12 Unidades.	Und	35.3	1
Beaker De Vidrio De 250 Ml, Caja de 6-12 Unidades.	Und	86.42	1
Beaker de vidrio 1000 ml, Caja de 6-12 Unidades.	Und	52.45	1
Cámara cuenta glóbulos Neubauer, Paquete 10-25 Unidades	Und	962.09	1
Canasta de acero inoxidable para secar tubos de ensayos 152 * 152 * 152 mm, Unidad	Und	421.26	1
Cubre cámara, Caja de 10-50 Unidades.	Und	10.5	1
Cubre objetos 22 * 22 # 2 Caja 1 Onza (Onza de 100 unidades).	Onz	3.29	1
Detergente no iónico, Ph neutro, biodegradable, libre de fosfato, Envase de 3,785ml.	Gln	360.26	1
Erlen Meyers de vidrio de 250 ml con tapón de rosca, Caja de 6 Unidades.	Und	218.59	1
Erlen Meyers de vidrio de 500 ml con tapón de rosca, Caja de 6 Unidades.	Und	214.02	1
Escobillon mediano (para tubos 16 * 100 mm), Caja de 6-12 Unidades.	Und	18.26	1
Escobillón pequeño (para tubos 13 * 75 mm), Caja de 6-12 Unidades	Und	11.82	1
Frasco plástico con tapa para recolectar esputo, Paquete 25-100 Unidades.	Fco	12.63	1
Gradilla plástica para 48-72 tubos de 12 * 75 mm, Caja de 5 -10 Unidades.	Und	223.19	1
Gradilla plástica para 48-72 tubos de 13 * 100 mm, Caja de 5 -10 Unidades.	Und	223.16	1
Gradilla plástica para 48-72 tubos de 16 * 100 mm, Caja de 5 -10 Unidades.	Und	269.98	1
Lámina de cera selladora, Caja de 6-12 Unidades.	Und	32.79	1
Lanceta descartable punto medio, Caja de 100-200 Unidades.	Und	0.27	1
Lápiz graso o de cera, Caja de 6-12 Unidades.	Und	13.07	1
Malla de asbesto o teflón, Paquete 5 -12 Unidades	Und	35.44	1
Mechas para mechero de alcohol, Paquete de 12 Unidades.	Und	14.2	1
Mechero de alcohol, Caja de 50-100 Unidades.	Und	71.33	1
Papel filtro # 40 de 11 cm de diámetro, Caja de 100 Unidades.	Caj	88.99	1
Papel para limpiar lentes de microscopio, Libreta de 50 Hojas.	Lbt	15.27	1

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Papel parafina, Caja de 12 Unidades.	Roll	235.26	1
Pipeta automática 50-200 µl, Unidad	Und	914.09	1
Pipeta automática 200-1000 µl, Unidad	Und	914.09	1
Pipeta automática 1000-5000 µl, Unidad	Und	916	1
Pipeta glóbulo blanco, Caja o Bolsa de 50-100 Unidades.	Und	71.03	1
Pipeta glóbulo rojo, Caja o Bolsa de 5-10 Unidades.	Und	71.03	1
Pipeta pasteur 145mm * 230mm, Caja de 100-250 Unidades.	Und	0.52	1
Pipeta sahli, Caja de 10 Unidades.	Und	18.78	1
Pizeta de enjuague 250 ml de color, Paquete 6 Unidades.	Und	90.39	1
Pizeta de enjuague 500 ml blanca, Paquete 6 Unidades.	Und	36.58	1
Porta objetos 3 * 1 , Caja de 50-144 Unidades.	Und	0.49	1
Probeta cilíndrica de vidrio de 100 ml, Caja de 4-8 Unidades.	Und	215.89	1
Probeta cilíndrica de vidrio de 500 ml, Caja de 4 Unidades.	Und	192.36	1
Punta para Pipeta Automatica 1-50µl, Caja de 250-1000 Unidades.	Und	0.08	1
Punta para pipeta automática 1-200 µl , Caja de 250-1000 Unidades.	Und	0.15	1
Punta para pipeta automática 200-1000 µl, Caja de 250-1000 Unidades.	Und	0.06	1
Punta para pipeta automática 1000-5000 µl, Caja de 250-1000 Unidades.	Und	1.74	1
Tapón de rosca para tubo 16 * 150 mm, Caja de 100-250 Unidades.	Und	1.56	1
Termómetro de 0-100 ºC, Caja de 10 Unidades	Und	67.03	
Termómetro de 0-200 ºC , Caja de 10 Unidades.	Und	182.28	
Tubo capilar con anticoagulante Fco de 500, Unidades.	Und	0.24	1
Tubo capilar sin anticoagulante Fco de 500, Unidades.	Und	0.22	1
Tubo con tapón de rosca 16 * 150 mm Caja de 100-250, Unidades.	Und	4.85	1
Tubo conico plastico sin tapon 16 * 100 mm, Caja de 50-100 Unidades.	Und	14.72	1
Tubo de ensayo de vidrio sin labio 12 * 75 mm, Caja de 50-100 Unidades.	Und	0.46	1
Tubo de ensayo de vidrio sin labio 13 * 100 mm, Caja de 50-100 Unidades.	Und	0.82	1
Tubo de ensayo de vidrio sin labio 16 * 100 mm, Caja de 50-100 Unidades.	Und	0.85	1
Tubo de ensayo de vidrio al vacío sin labio 16 * 100 mm sin anticoagulante, Caja de 50-100 Unidades.	Und	1.62	1
Tubo de ensayo de vidrio con citrato al 3.2% 12 * 75 mm, Caja de 50-100 Unidades.	Und	1.39	1
Tubo de ensayo de vidrio con EDTA 12 * 75 mm, Caja de 50-100 Unidades.	Und	1.39	1
Tubo wintrobe, Caja 1 Unidad	Und	1.32	1
Pericraneal colector de sangre con dispositivo de seguridad 21G x 3/4 mariposa 30cm con adaptador de tubo al vacio o jeringa	Und	17.14	1
Tubo de plastico minicolector de 0.5ml con EDTA K3 Tapón Lila	Und	5.32	1
Tubo de plastico minicolector para 0.8ml de suero + Gel - Rojo (AU)	Und	51.22	1
Beaker de vidrio 600 ml, Caja de 6-12 Unidades.	Und	79.76	1
Canastilla para tinción con capacidad de 20 - 30 láminas, Caja de 6-12 Unidades.	Und	531.28	1
Cubeta de vidrio para tinción con capacidad de 30 láminas, Unidad	Und	549.6	1
Cubre objeto 22 * 22 # 1, Caja 1 Onza (Onza de 100 unidades)	Onz	6	1
Cubre objeto 22 * 50, Caja 1 Onza (Onza de 50 unidades)	Onz	3.9	1
Cubre Objeto 22 * 60, Caja 1 Onza (Onza de 100 unidades)	Onz	11.54	1
Frasco gotero ámbar de 10 ml, Caja 1-20 unidades.	Und	7.4	1

DescripciónInsumo	U/M	Precio Unitario	Laboratorio
Frasco Gotero Color Ambar 120ml, Caja 100-500 unidades.	Und	3.56	1
Lápiz punta de diamante, Unidad	Und	209.05	1
Lente de protección de policarbonato, incoloro, para protreccion UV e IR tamaño estándar, Caja 5 - 12 Unidades.	Und	92.56	1
Probeta cilíndrica de vidrio de 50 ml, Paquete de 4 Unidades.	Und	60	1
Cloruro de benzalconio al 1% (Benzal) Solución de compuestos cuaternarios del amonio (CCA), desinfectante y antiséptico de amplia acción antimicrobiana para Gram Positivos y Gram negativos, Envase de 3,785 ml.	Gln	23.39	
Clorhexidina digluconato, solución 4 % para lavado quirúrgico (Hibiscrub). Jabón bactericida, contra bacterias no esporuladas, hongos y virus. La clorohedixina es efectivo contra virus lipofílicos: VIH, influenza virus y herpes virus tipo 1 y 2. Envase re	Gln	215.48	
Glutaraldehído, solución 2 % con activador (Cidex). Solución desinfectante y esterilizante de amplio espectro antimicrobiano, tuberculicida, viricida, esporicida, y fungicida. Con propiedades anticorrosivas. Envase de 3,785 ml.	Gln	117.15	
Yodo povidone (polividona yodada), solución 7.5 % . Solución iodófora, resultante de la combinación de yodo y un agente soluble o portador. Compuesto de polivinilo pirrolidona con yodo. Frasco color ámbar, Envase de 3,785 ml.	Gln	269.89	
Yodo povidone (polividona yodada), solución 10 % . Solución iodófora, resultante de la combinación de yodo y un agente soluble o portador. Compuesto de polivinilo pirrolidona con yodo. Frasco color ámbar, Envase de 3,785 ml.	Gln	231.83	
Alcohol etílico + Glicerina solución 70 % Gel. Envase de 1 litro con Dosificador.	Lts	50.98	
Indicador Biologico p/prueba de esterilizacion c/esporas de geobacillus esterothermophilus que se inlcuya la adquisicion de una incubadora basica no digital 1 por hospital	Amp	15	

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